NEW BRUNSWICK'S MINERAL INDUSTRY, 1981

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Hon. Gerald S. Merrithew, Minister

1982

NEW BRUNSWICK'S MINERAL INDUSTRY

1981

Mineral Resources Division
Department of Natural Resources
New Brunswick

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PREFACE

This is the fifth in a series of reports on the Mineral Industry of New Brunswick. The information contained within the report, which is not contained in our normal series of reports, will serve as a historical record of exploration, development and mining activities that have occurred within the Province during 1981.

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CHAPTER 1. INDUSTRIAL ACTIVITY

VALUE OF PRODUCTION

The value of mineral production reached a record high in 1981 in spite of the fact that the Province's only antimony producer ceased operations. A number of significant developments took place during the year that will beneficially affect the long-term development of New Brunswick's mineral industry. The most important of these include the readying of two new mines for production and a decision to proceed with the construction of a long-awaited zinc smelter at Belledune. In addition, exploration for oil, gas, potash, base metals and oil shale has been continued, and several mineral deposits are in the final stages of exploration and testing, with production decisions expected shortly.

Developments planned or in progress should increase the value of mineral production considerably during the 1980's. Although zinc and lead now contribute 64 per cent of the total, potash, salt, tungsten and molybdenum will make a significant contribution in the future. Zinc, lead and silver reserves in the Bathurst-Newcastle area are substantial, and possibly constitute well in excess of 50 per cent of Canada's known reserves. On a province by province basis, New Brunswick ranks first in the production of antimony and bismuth, second in zinc and peat, third in lead and silver, and fifth in copper.

The value of minerals produced in 1981 totalled $535,328,354, a $163 million increase over the 1980 final figure of $372,522,000. This low, in 1980, was due mainly to a four-month strike at the Brunswick Mining and Smelting Corporation Limited zinc-lead-copper-silver mine near Bathurst. In 1981, production of other associated metals increased proportionally. Non-metallics, particularly those required by the construction industry, showed slight decreases during the year. (Tables 1 and 2)

Mining is New Brunswick's fastest growing industry. On the basis of projects planned or in progress, the 1980's should witness continued growth and diversification. The value of minerals produced should exceed $1 billion by 1990. Mining is becoming a major employer, and the industry should provide more than 7,000 direct jobs by the end of the next decade. New capital in mines, concentrators and smelters, as well as in mineral-based manufacturing, could exceed $1 billion during the same period. (Figure 1)

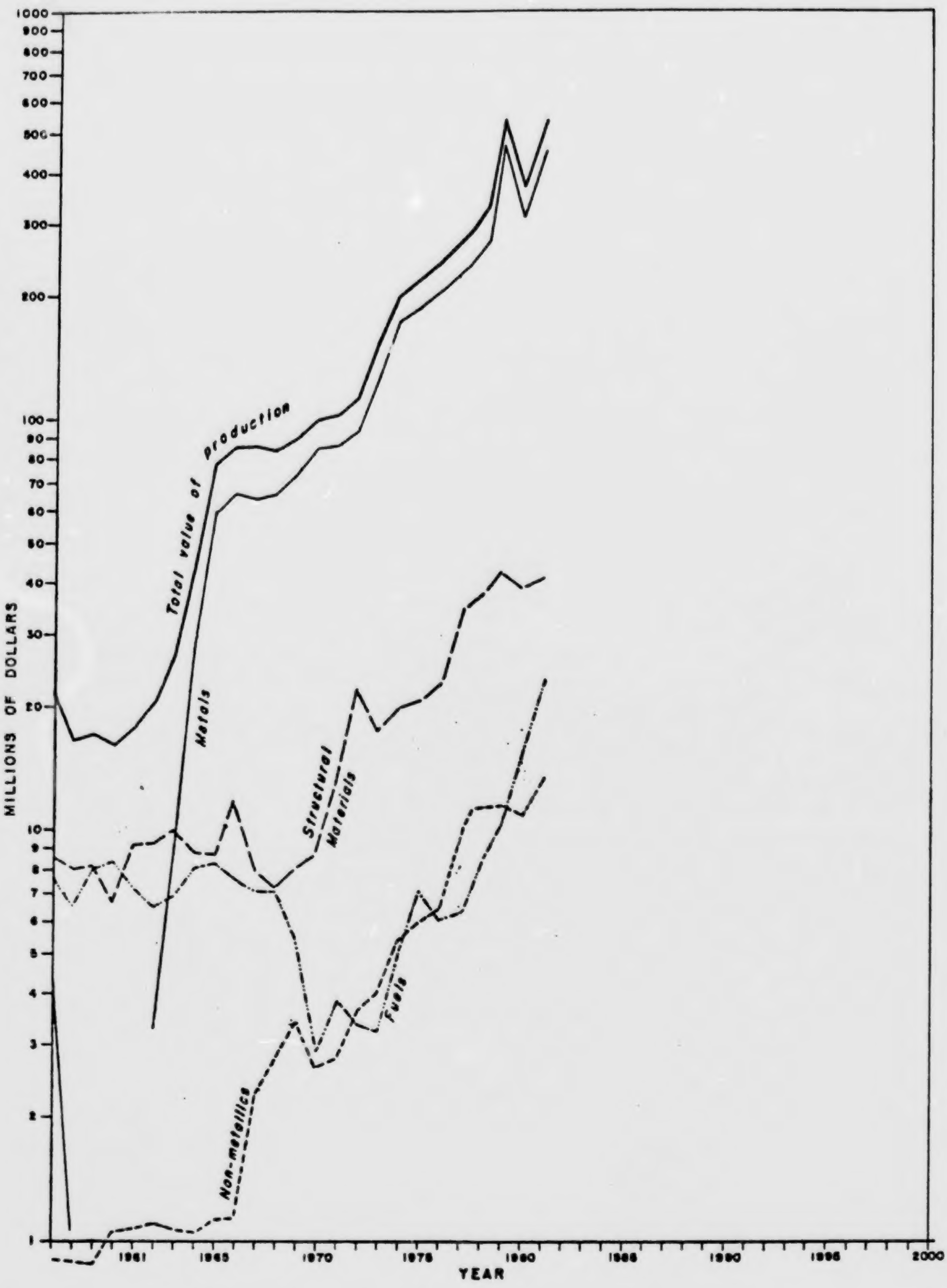


Figure 1. Value of mineral production 1957-1981

EMPLOYMENT

During 1981 the total number of direct employees at producing mines and quarries was approximately 5850 (Table 3). Although it is difficult to determine exactly how many people are employed in exploration, it was estimated a few years ago that close to 600 people were engaged in geological, geophysical and geochemical surveys, exploration drilling, analytical laboratories and with land surveyors. This figure is probably a reasonable estimate of the numbers employed in exploration during 1981. Table 4 shows the distribution of employment in the metal, potash and coal-producing industries since 1970.

MINING AND DEVELOPMENT

Metal mines in production during the year include Brunswick Mining and Smelting Corporation Ltd. (No. 6 and No. 12 deposits), Heath Steele Mines Ltd. and Consolidated Durham Mines and Resources Limited.

Brunswick's expansion to 10,000 tpd was opened officially in the early summer. Although actual throughput was slightly higher than planned, the overall operation was hampered by higher costs. Heath Steele, 75 per cent owned by Brunswick, maintained production during the year with a mill rate of 4000 tpd. The decision by Brunswick Mining and Smelting to proceed with a $360 million 100,000 tpy zinc smelter was announced in November. This decision culminated extensive negotiations by the Company, the Canada Departments of Energy, Mines and Resources, and Regional Economic Expansion, and the Provincial Departments of Natural Resources and Commerce and Development. More than $3 million has been spent on engineering and feasibility studies to date. Construction will commence in the spring of 1982, with employment of approximately 1000. More than 400 will be directly employed when production commences in 1984. Brunswick Mining, one of the world's largest zinc producers, currently produces more than 250,000 tons of zinc, 66,000 tons of lead, and close to 7.1 million oz. of silver annually.

Consolidated Durham Mines and Resources ceased production at the antimony mine near Fredericton early in 1981. The company has successfully delineated another antimony zone on the property, and development plans are now being finalized. Interesting gold, tungsten and molybdenum values have also been encountered. (Figure 2)

Deep exploration at the Anaconda Caribou deposit west of Bathurst has been completed, and testing is now in progress underground. Metallurgical work has also been carried out during the year. This company, with Billiton, has expressed interest in the RPC sulphation roast technology as a means of improving metal recovery. In January, a decision was made by the companies involved to defer a decision to proceed with a $20-$30 million pilot plant, pending further research on some aspects of the process. Billiton, currently developing the Mount Pleasant tungsten-molybdenum property, is actively involved in the Bathurst-Newcastle area, and has done a considerable amount of work on the Halfmile Lake and Restigouche zinc-lead-silver deposits.

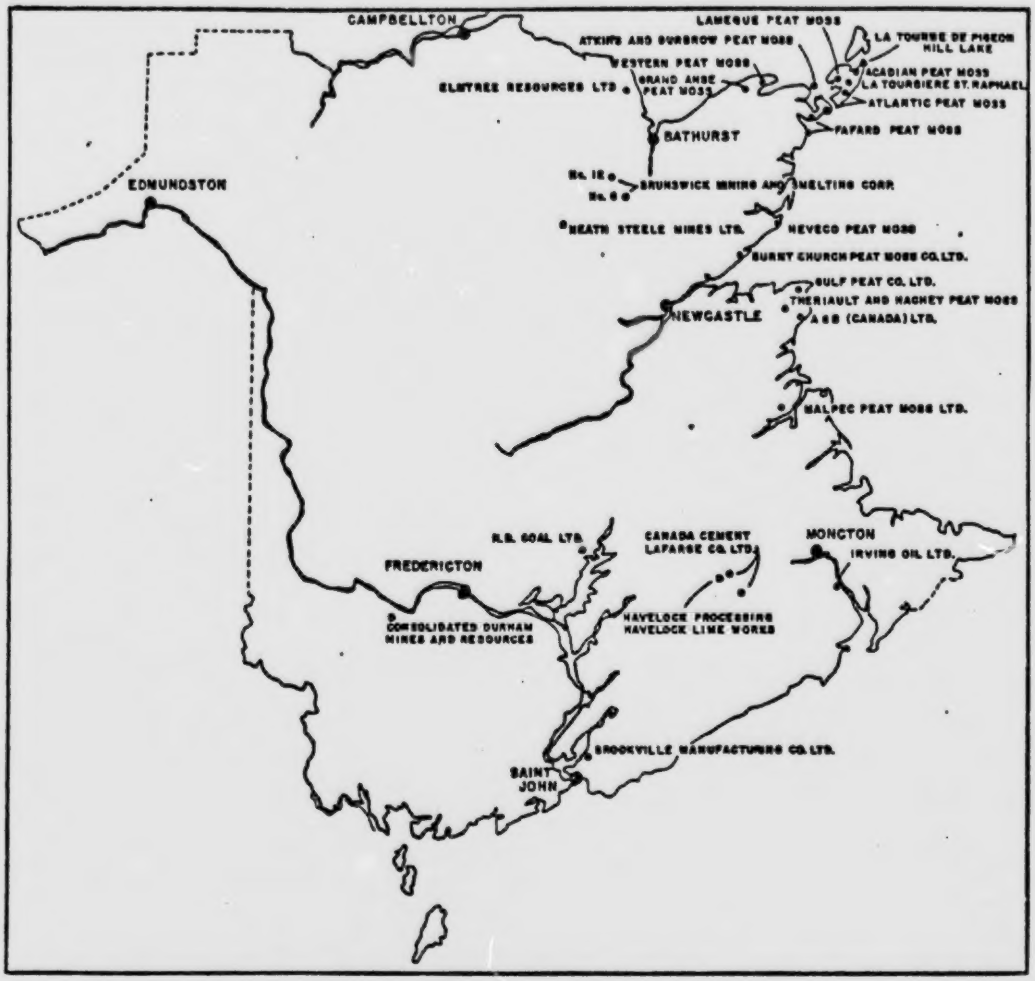

CAMPBELLTON
LAMEQUE PEAT MOSS
ATKINS AND BURBROW PEAT MOSS
LA TOURBE DE PIGEON HILL LAKE
WESTERN PEAT MOSS
ELMTREE RESOURCES LTD
GRAND ANSE PEAT MOSS
ACADIAN PEAT MOSS
LA TOURBIERE ST. RAPHAEL
ATLANTIC PEAT MOSS
BATHURST
FAFARD PEAT MOSS
No. 12
No. 6
BRUNSWICK MINING AND SMELTING CORP.
EDMUNDSTON
HEATH STEELE MINES LTD.
NEVECO PEAT MOSS
BURNT CHURCH PEAT MOSS CO. LTD.
GULF PEAT CO. LTD.
THERIAULT AND HACHEY PEAT MOSS
NEWCASTLE
A & B (CANADA) LTD.
MALPEC PEAT MOSS LTD.
N.B. COAL LTD.
CANADA CEMENT LAFARGE CO. LTD.
MONCTON
IRVING OIL LTD.
FREDERICTON
CONSOLIDATED DURHAM MINES AND RESOURCES
HAVELOCK PROCESSING
HAVELOCK LIME WORKS
BROOKVILLE MANUFACTURING CO. LTD.
SAINT JOHN

Figure 2. Non-renewable resource producers in New Brunswick 1981

Development work and plant construction are under way at the Mount Pleasant tungsten mine property of Billiton and Brunswick Tin Mines Ltd. This mine, scheduled to produce 1980 tpy of tungsten oxide, and 660 tpy of molybdenum disulphide concentrate, is scheduled for production late in 1982. This project will cost in excess of $80 million, and will employ about 250.

Coal production at the Grand Lake operation of N. B. Coal Ltd. increased to 520,000 tons in 1981. All of the production is sold to the New Brunswick Electric Power Commission's thermal plants. Under a new coal policy, the Hon. J. W. Bird, Minister of Natural Resources, stated that exploration-development rights for areas with coal potential will be offered on a regular basis, with the New Brunswick Electric Power Commission having a 60-day right of first refusal. The first area offered under this policy should be granted early in 1982.

The quarries and wallboard plant of Canadian Gypsum Limited ceased operations late in 1980 due to reduced markets and high processing costs. They were the only wallboard plant in eastern Canada, and the quarries in the Hillsborough area have been worked for more than 130 years.

Operations at the Canada Cement plant, near Havelock, continued throughout the year with a slight decline in production. The limestone operations of Havelock Lime Limited, Elmtree Resources Limited, and Brookville Manufacturing Limited were also sustained throughout 1981. Chaleur Silica Limited provided quartz flux for the lead smelter at Belledune.

Work continued at three potash projects in southeastern New Brunswick. Construction of the mine and concentrator at Potash Company of America's property east of Sussex continued, with production planned for mid-1983. This development, costing in excess of $150 million, will employ 250-300 people when in full operation. A $40 million potash shipping terminal will be built at Saint John, 37 miles to the west. A small amount of salt was produced and sold during the year.

Denison Mines Limited and Potash Company of Canada Limited continued shaft sinking on their Salt Springs property 10 miles south of Sussex. The company has experienced unforeseen delays, however the work is continuing and the pilot hole for the second shaft was completed in late 1981.

Peat moss production increased slightly during 1981. In addition to existing producers, a number of other bogs are being readied for full production.

No change was recorded in oil and natural gas production from the Irving Oil Company Limited operated Stoney Creek field south of Moncton.

Major aggregate producers, i.e. Brunswick Ready Mix Limited, Acadia Crushed Stone Limited, Moncton Crushed Stone Company Limited, Forbes and Sloat Limited, Diamond Construction Limited, MacDonald Paving and Construction Limited and Brookville Manufacturing Company Limited were in full production during the year. Nelson Monuments Limited, the Province's major producer of ornamental stone, produced from granite quarries in the southern part of the Province.

EXPLORATION

Exploration continued in 1981 throughout the Province, with tungsten, molybdenum and tin receiving the most attention. Base metal exploration expenditures were concentrated in the northern part of the Province on or near known deposits. In the southern and central parts of the Province, interest was focused on the tungsten-tin potential of regions within or on the margins of Devonian batholiths and stocks. The number of new claims staked declined slightly from 1980 (Figure 3). However, the total number of claims or claim equivalents in effect increased, mainly because of the conversion of coal reservations in the Grand lake area to a mining licence. Total exploration expenditures for 1981 are not available, but on the basis of assessment work received, $5.1 million was spent (Figure 4). This was a significant increase over the previous year's figure of $3.6 million. Total expenditures reported on assessment work generally represented 25 to 30 per cent of the total actual expenditures in the Province.

Companies exploring in the northern part of the Province include Brunswick, Shell, Amax, Essex, Mattagami, Key Anacon, Canadian Occidental, Placer, Texasgulf and Esso Resources.

Metallurgical testing at the Burnt Hill tungsten property was halted during the year, and no plans for further work have been announced. To the southwest, interest was focused around the recently discovered tungsten-copper discovery of Texasgulf, located north of the Nashwaak River. Canadian Nickel, K.D.A. Whaley, Riocanex and Shell have also staked claims in the same area.

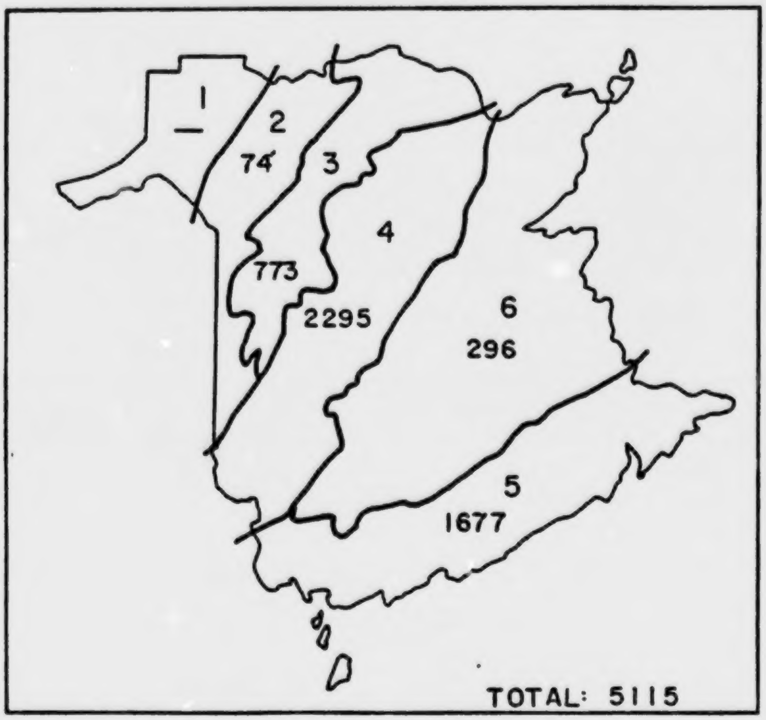


Figure 3. Number of claims staked in New Brunswick by metallogenic region in 1981

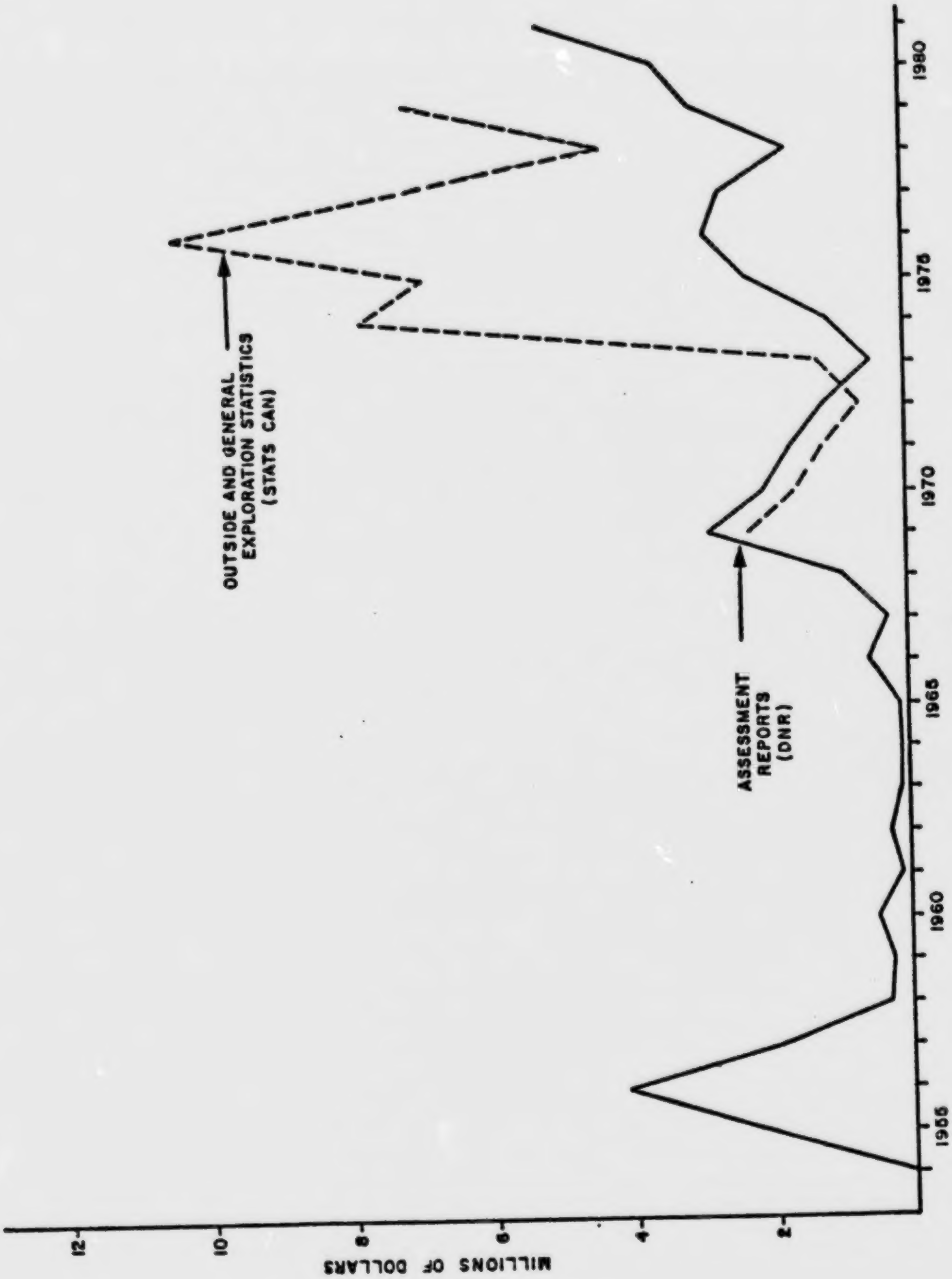


Figure 4. Exploration expenditures 1955-1981

Billiton is exploring west, north and east of their Mount Pleasant property. Shell and Maritime Explorations Ltd. were also active in the St. George-Mount Pleasant area, where tin, tungsten and molybdenum are the main minerals sought. BP Canada Limited, St. Joe Canada Limited and Lithochem Explorations are also active in southwestern New Brunswick. Interest in uranium has declined considerably in the past year, but a number of companies were still evaluating properties in the southern part of the Province. Included here are Uranerz Exploration and Mining Limited, Western Mines Limited, Gulf Minerals Canada Limited, Brunswick Mining and Smelting Corporation Limited, and Cominco Limited.

Campbell Resources Inc. carried out geophysical surveys in the Goose Creek area of the Caledonia Highlands, underlain by highly deformed Precambrian sedimentary and volcanic rocks. Some gold values have been encountered by Gordex Exploration Limited in the Cape Spencer area.

BP Canada Limited completed five holes on their Millstream potash prospect seven miles west of Sussex. Drilling is in progress to determine the extent of any potash present.

Although submissions were requested on another area with potash potential near Dorchester, the Province decided not to make an award at this time.

A major seismic program was carried out in southeastern New Brunswick by Chevron during the year, and was continued into Nova Scotia. Follow-up work and additional exploration is expected in the on- and off-shore areas of southern New Brunswick in 1982.

Canadian Occidental Petroleum Limited, working in southern New Brunswick since 1974, reduced the size of their area in the spring of 1981, and plan to carry out additional exploration this year. The Province's first oil shale "sale" was announced during the year. As a result, PetroCanada was awarded exploration rights on a 28,000 hectare area near Saint-Joseph.

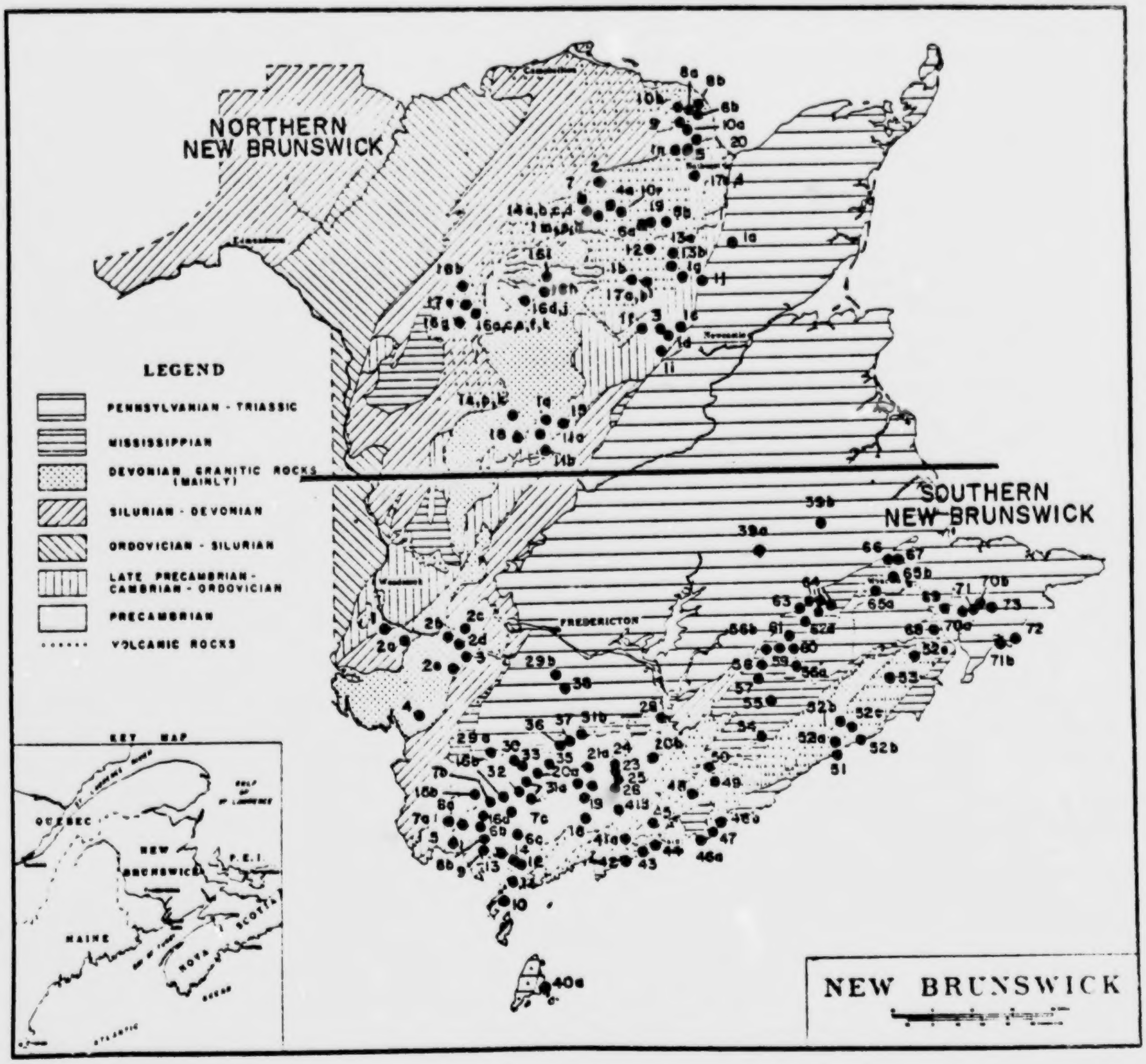

NORTHERN NEW BRUNSWICK
SOUTHERN NEW BRUNSWICK
LEGEND
PENNSYLVANIAN - TRIASSIC
MISSISSIPPIAN
DEVONIAN GRANITIC ROCKS (MAINLY)
SILURIAN - DEVONIAN
ORDOVICIAN - SILURIAN
LATE PRECAMBRIAN - CAMBRIAN - ORDOVICIAN
PRECAMBRIAN
VOLCANIC ROCKS
FREDERICTON
KEY MAP
QUEBEC
NEW BRUNSWICK
P.E.I.
MAINE
NOVA SCOTIA
NEW BRUNSWICK

Figure 5. Properties explored in New Brunswick in 1981

LIST OF COMPANIES AND INDIVIDUALS ACTIVELY EXPLORING IN NEW BRUNSWICK DURING 1981 (to accompany Figure 5)

Map No.	Company	Group or Block	N.T.S. Reference
	NORTHERN NEW BRUNSWICK		
	EDMUNDSTON, AROOSTOOK-MATAPEDIA AND CHALEUR-TOBIQUE ZONES (ZONE 1)		
16	Canadian Occidental Petroleum Limited	(a) Shin Group	21 0/3E
		(b) Shep Group	21 0/3E
		(c) Evy Group	21 0/3E
		(d) Left Group	21 0/3E
		(e) Stew Group	21 0/3E
		(f) Blue Group	21 0/3E
		(g) Black Group	21 0/3E
17	Mattagami Lake Explorations Limited	Tobique project	21 0/3E
20	Essex Minerals	Nicholas Denys (Stephens Brook) area	21 P/12W
	ELMTREE SUBZONE (ZONE 2)		
8	C. A. Willett	(a) Belledune area	21 P/13W
		(b) Muddy Lake	21 P/13W
9	Don Black	Heron Prospect	21 P/13W
10	Esso Resources Canada Limited	(a) Belledune River area	21 P/13W
		(b) Heron (Turgeon) Prospect	21 P/13W
	MIRAMICHI ZONE (ZONE 3)		
1	Brunswick Mining and Smelting Corporation Limited	(a) Project 203	21 P/5E
		(b) Clearwater Group	21 0/1
		(c) Parks Brook	21 J/16
		(d) Tomahawk Group	21 J/16
		(e) Burnt Hill Brook	21 J/10W
		(f) Malcolm Brook	21 J/16W
		(g) Little River South	21 P/4W
		(h) Mount Fronsac	21 0/8W
		(i) McGraw Brook	21 J/16
		(j) Smoker Brook	21 P/4
		(k) Slate Island Brook	21 J/10W
		(l) East Elbow	21 0/8W
		(m) Devils Elbow	21 0/8W
		(n) Millstream Group	21 0/9E, 21 P/12W
		(o) O'Hearn Extension	21 0/8E, 21 0/9E
		(p) McLean Brook	21 J/10W
		(q) Long Pond Group	21 J/10E
		(r) Indian Lake property	21 0/8E & W
2	Anaconda Canada Limited	Caribou Project M.L. 798A, 798B	21 0/9W
3	Delbert Johnson	Parks Brook	21 J/10E
4	South Bathurst Joint Venture	Long Pond property	21 0/8E
5	Millstream Mines Limited	Mining Licence 1212	21 P/12W
6	Norman Pitre	(a) Wedge West Group	21 0/8E
		(b) Belledune area	21 P/13W
7	Metallgesellschaft Canada Limited	Upsalquitch Group	21 0/8W
11	Texasgulf Incorporated	(a) Rocky Brook North	21 J/10E
		(b) Rocky Brook	21 J/10E
12	Cominco Limited	Stratmat, M.L. 1007, 1008	21 0/8E
13	Heath Steele Mines Limited	(a) East Boundary Extension	21 0/8E
		(b) Island Lake claims	21 0/8E

14	Dungannon Explorations Limited	(a) Mining Licence 1297 (b) Upsalquitch property (south) (c) Upsalquitch property (east) (d) Mining Licence 1303	21 0/8W 21 0/9W 21 0/8W 21 0/8W
15	Dungarvon Resources Limited	Mining Licence 1315	21 J/10E, 21 J/15E
16	Canadian Occidental Petroleum Limited	(d) Shawn Group (h) Bear Group (i) Serpy Group (j) Long Group	21 0/2W 21 0/2W 21 0/2W 21 0/2W
17	Mattagami Lake Explorations Limited	(a) Area "L" (b) Area "K" (c) Area "C" (d) Area "D"	21 0/1E 21 0/1E 21 P/12W 21 P/12W
18	Gulf Minerals Canada Limited	Boiestown Block III	21 J/7W, 21 J/10W
19	Clearwater Mines Limited	Canoe Landing Lake, M.L. 1231	21 0/8E

SOUTHERN NEW BRUNSWICK

SOUTHERN MIRAMICHI ZONE

1	BP Minerals Ltd.	Eel River claims	21 G/13E

MAGAGUADAVIC ZONE

2	Brunswick Mining and Smelting Corporation Limited	(a) Canterbury (b) Davidson Lake (c) Scotch Lake (d) Joslin Creek (e) Lake George Group	21 G/14W 21 G/14E 21 G/14E 21 G/14E 21 G/14E
3	Consolidated Durham Mines & Resources Ltd.	Lake George	21 G/14E
4	Robert Connor & Ronald Morrison	Coac Stream-Upper Caverhill	21 G/14E
5	Cuvier Mines Inc.	Magaguadavic Lake	21 G/11W

ST. CROIX ZONE

6	Atlantic Nickel Mines Ltd.	Blackland	21 G/3W
7	Billiton Canada Ltd.	(a) Tower Hill (b) Pleasant Ridge (c) Miles Brook	21 G/6E 21 G/6E & 7W 21 G/7W
8	Shell Canada Resources Ltd.	(a) Foster Lake (b) Magaguadavic River (c) South Oromocto Lake	21 G/6E 21 G/7W 21 G/7W
9	Goldfluor Explorations Ltd.	(a) Central Tower Hill (b) Navigation Lake	21 G/6E 21 G/3E
10	M.E.X. Explorations Ltd.	Bonaparte Lake	21 G/3E
11	Peter Sternberg	(a) Letete (b) Anderson Mountain	21 G/2W 21 G/2W
12	BP Minerals Ltd.	Anderson Mountain	21 G/2W
13	A. W. Lockhart	Digdeguash	21 G/2W
14	Westmin Resources Ltd.	Lily Lake	21 G/2W
15	Rio Tinto Canadian Expl. Ltd.	(a) Digdequash River (b) Flume Falls	21 G/6E 21 G/6E & 7W
16	M.E.X. Explorations Ltd.	(a) Pomeroy (b) Piskahegan Stream	21 G/7W 21 G/7W

17	Beth Canada Mining Co.	True Hill	21 G/7W
18	Canadian Nickel Co. Ltd.	Bear Lake	21 G/7E
19	Shell Canada Resources Ltd.	Victoria-Mistake Lake	21 G/7E
20	Uranerz Expl. & Mining Co.	(a) Sandbrook Mountain (b) Browns Flats	21 G/7E 21 G/8E
21	Westmin Resources Ltd.	(a) Falls Brook (b) Caribou Lake	21 G/8W 21 G/8W
22	Billiton Canada Ltd.	Square Lake	21 G/8W
23	Morton Gordon	Cunningham Creek	21 G/8W
24	Canadian Nickel Co. Ltd.	(a) Wedderburn Lake (b) Bear Lake	21 G/8W 21 G/2E
25	J. J. Dolan	Nerepis Prospect	21 G/8W
26	BP Minerals Ltd.	Capple Lake	21 G/8W
27	M.E.X. Explorations Ltd.	Caribou Lake	21 G/8W
28	Dome Exploration (Canada) Ltd.	Fanning Brook	21 G/9E

CENTRAL PLATFORM

29	Cominco Ltd.	(a) Kedron Lake-Shin Creek (b) Rusagonis-French Lake	21 G/6E, 21 G/11E 21 G/10W, 21 G/10E
30	Billiton Canada Ltd.	(a) Mount Pleasant (b) Niles Brook	21 G/7W 21 G/7W
31	Shell Canada Resources Ltd.	(a) Mud Lake (b) Mill Settlement	21 G/7W 21 G/10E
32	J. D. Irving Ltd.	McDougall Inlet	21 G/7W
33	Sullico	Little Mount Pleasant	21 G/7W
34	M.E.X. Explorations Ltd.	Blind Lake	21 G/7E & W
35	Rodney G. Orr	Duck Lake	21 G/7E & 10W
36	H. C. McNamara	Shin Creek	21 G/10E
37	Royal Trust Corp. of Canada	Juvenile Settlement	21 G/10E
38	Maxwell Rodgers	Woodside	21 G/10E
39	St. Lawrence Cement Co.	(a) E. Branch Coy Brook (b) Adamsville	21 I/6W 21 I/6E

CALEDONIA ZONE

40	Great Horn	(a) Nantucket Island (b) White Head Island	21 B/10 21 B/10
41	J. J. Dolan	(a) Musquash (b) Eagle Lake	21 G/1W 21 G/1W & 8W
42	Morton Gordon	Musquash Harbour	21 G/1W
43	W. G. Walton	Musquash Harbour	21 G/1E
44	Great Horn Mining Syndicate	Lorneville	21 G/1E
45	Ketepec Development Ltd.	Ketepec	21 G/8E
46	Morton Gordon	(a) Cape Spencer (b) West Beach	21 G/4W 21 G/4W
47	H. C. McNamara	Cape Spencer area	21 G/4W

48	Brunswick Mining and Smelting Corporation Limited	Quispamsis	21 H/5W
49	Great Horn Mining Syndicate	MacFarlane Lake	21 H/5W
50	J. D. Irving	Nauwigewauk	21 H/5W
51	Denison Mines Ltd.	Martin Head	21 H/6E, 21 H/11E
52	C.C.H. Minerals Ltd.	(a) Quiddy River (b) Mackeral Cove (c) Goose Creek (d) Upper Goose Creek (e) Crooked Creek	21 H/11E 21 H/11E 21 H/11E 21 H/11E 21 H/15W
53	Texasgulf Canada Ltd.	Teahans Corner	21 H/10W

MONCTON-CUMBERLAND BASIN

54	Denison-Potacan Potash Co.	Salt Springs	21 H/12E
55	Uranerz Exploration & Mining Ltd.	Wards Creek	21 H/12E
56	Shell Canada Resources Ltd.	(a) New Line Road (b) Carsonville	21 H/12E & 11W 21 H/13E & 14W
57	BP Exploration Canada Ltd.	Millstream	21 H/12E
58	Gulf Minerals Canada Ltd.	Lower Millstream	21 H/12E
59	James Colucci	Jordan Mountain	21 H/14W
60	Potash Company of America	Plumweseep-Penobsquis	21 H/11W, 14W, 14E
61	St. Lawrence Cement Co.	Dunsinane Coal	21 H/14W
62	Arnold E. Alward	(a) Samphill (b) Havelock	21 H/14W 21 H/14W
63	Havelock Lime Works Ltd.	Samp Hill	21 H/14W
64	Canada Cement Co. Ltd.	(a) Glenvale (b) Kinnear Settlement (c) Stevens Settlement (d) Springhill	21 H/14E 21 H/14W 21 I/3W 21 I/3W
65	Canadian Nickel Co. Ltd.	(a) Steeves Mountain (b) Berry Mills-Shediac River	21 I/3E & 2W 21 I/2W
66	Casan Mining Ltd.	Indian Mountain	21 I/2W
67	Aquitaine Co. of Canada Ltd.	Lutes Mountain	21 I/2W
68	Canadian Gypsum Co. Ltd.	Edgetts Landing	21 H/15E
69	W. P. Hachey	Saint Joseph	21 H/15E
70	Joint Tantramar Venture	(a) Middleton (b) Long Lake	21 H/16W 21 H/16W
71	H. R. Norrie	(a) Upper Sackville (b) Aulac	21 H/16W 21 H/16W
72	Denison Mines Ltd.	Point de Bute	21 H/16W
73	Brunswick Mining and Smelting Corporation Limited	Midgic	21 H/16W

CHAPTER 2. GOVERNMENT ACTIVITY

Government evaluations of New Brunswick's mineral potential began nearly 150 years ago when Abraham Gesner was first appointed to carry out a systematic survey of the geology and mineral resources of the province.

In recent years, these activities have been much expanded with the Mineral Resources Division carrying out, in addition to geological mapping and mineral inventories, a wide variety of studies and projects that range from special metallurgical investigations, road construction, the production of films, etc.

Regional geological surveys, under the auspices of the Geological Survey of Canada, began shortly after Confederation in 1867. By the early 1900's, these surveys were completed with the bedrock and surficial geology of the entire province mapped at a scale of four miles equals one inch. During the first half of the present century, the Geological Survey of Canada continued mapping but at a somewhat reduced rate, producing geological maps at a scale of one inch equals one mile, and concentrating their efforts mainly in the southern part of the Province.

The presence of the province in non-renewable resources studies became significant in 1929 when Dr. W. J. Wright was appointed Provincial Geologist. Although Dr. Wright's main interest was in gypsum, coal and oil, he nevertheless studied and wrote reports on many of our metallic occurrences as well.

The need for detailed geological mapping within the province became apparent with the "Bathurst discoveries" in the early 1950's, and in response the Branch embarked upon a one-quarter mile scale geological mapping programme in the Bathurst-Newcastle camp. A limited number of these maps, in addition to several provincially sponsored one mile geological maps, were produced in the succeeding years.

In 1965, the Department was reorganized and the geological staff increased. Studies were initiated in geochemistry and industrial minerals, and on the structure and stratigraphy of Siluro-Devonian and Carboniferous rocks.

An agreement between the province and the Federal Department of Regional Economic Expansion, signed in 1969, permitted the Branch to undertake and expand resource evaluation programmes. Quarter-mile geological mapping in northern and southern New Brunswick and a salt-potash drilling project formed the cornerstones of the agreement. The success of this initial agreement resulted in the signing of a second broader-scaled agreement in 1976. Much of the present work of the Branch is concerned with these jointly-sponsored projects, and will continue to be so until the termination of the agreement in 1982.

Existing provincial programmes were complimented during the year by projects carried out under the Minerals and Fuels Subagreement, the Northeast Subagreement, and the Developing Regions Agreement of the General Development Agreement. Total expenditures amounted to $1,401,048.80.

Programs carried out by the New Brunswick Department of Natural Resources are designed to promote and encourage the orderly exploration for, and development and processing of, the province's mineral resources. Most of the work completed in 1981 was funded by a $11.3 million, six-year federal-provincial agreement. Projects planned for 1982 will complete this work. In addition to one inch equals 1/4 mile mapping in the central part of the province, detailed investigations were concentrated in the southern and western parts of the province. The inventory of the province's peat resources was also completed. Follow-up work on the RPC sulphation roast technology is in progress, together with special studies on coal desulphurization and shale oil extraction. A program to encourage prospecting, and to make the public more aware of New Brunswick's mineral industry, was organized in 1981. A panel display toured major cities throughout the province during the summer months.

New Brunswick has always maintained that it can attract exploration and development investment by a good data base, fair legislation and a reasonable tax base. Producing metal mines are subject to a fixed tax rate of 16 per cent plus a two per cent net revenue tax, making the marginal rate about 54 per cent. The manufacturing rate in New Brunswick is 48 per cent. Brunswick Mining and Smelting and other companies are taking advantage of incentives introduced in the Mining Income Tax Act of 1977. Under this Act, 25 per cent of the cost of approved process research expenditures can be deducted from the tax payable. Effective April 1, 1982, exploration expenditures in the province may be deducted at a rate of $1.50 for every $1.00 spent.

New Brunswick's Mining Act is also being revised, and comment will be solicited from various associations affected by this legislation.

Reclamation guidelines were finalized early in 1980, and will be applied to all mines and quarries in the province. They were developed in consultation with industry and with the departments of environment and agriculture, and draft regulations are now being drafted. Mines, quarries, concentrators and processing plants are also subject to Canada and New Brunswick environmental standards with respect to air and water quality.

PROGRAMMES

A variety of projects are carried out by Mineral Resources for the purpose of providing an inventory of the province's mineral resources in order to assist industry, government and the general public in the management and orderly development of these resources.

Figures 6 and 7 give the location of projects carried out respectively under Provincial and Federal-Provincial sponsorship.

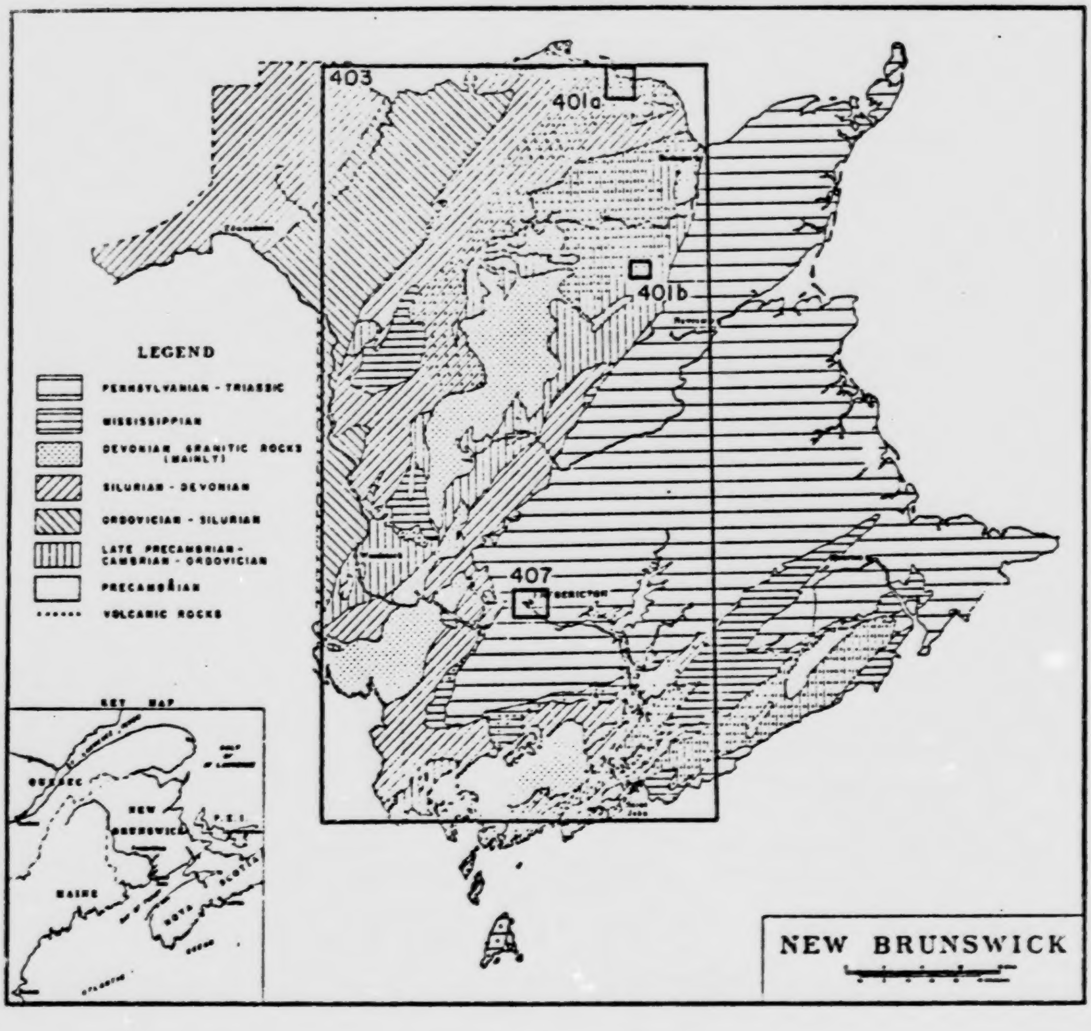

403
401a
401b
407
FREDERICTON
LEGEND
PENNSYLVANIAN - TRIASSIC
MISSISSIPPIAN
DEVONIAN GRANITIC ROCKS (MAINLY)
SILURIAN - DEVONIAN
ORDOVICIAN - SILURIAN
LATE PRECAMBRIAN - CAMBRIAN - ORDOVICIAN
PRECAMBRIAN
VOLCANIC ROCKS
KEY MAP
QUEBEC
NEW BRUNSWICK
P.E.I.
MAINE
NOVA SCOTIA
NEW BRUNSWICK

Figure 6. Areas in which provincial projects were carried out in 1981-82: 401a (Silurian-Devonian zone metals study), 401b (geological mapping-09), 403 (comparative investigation of mineral deposits in New Brunswick granitoid rocks), 407 (public awareness program, microfilming of geoscientific data)

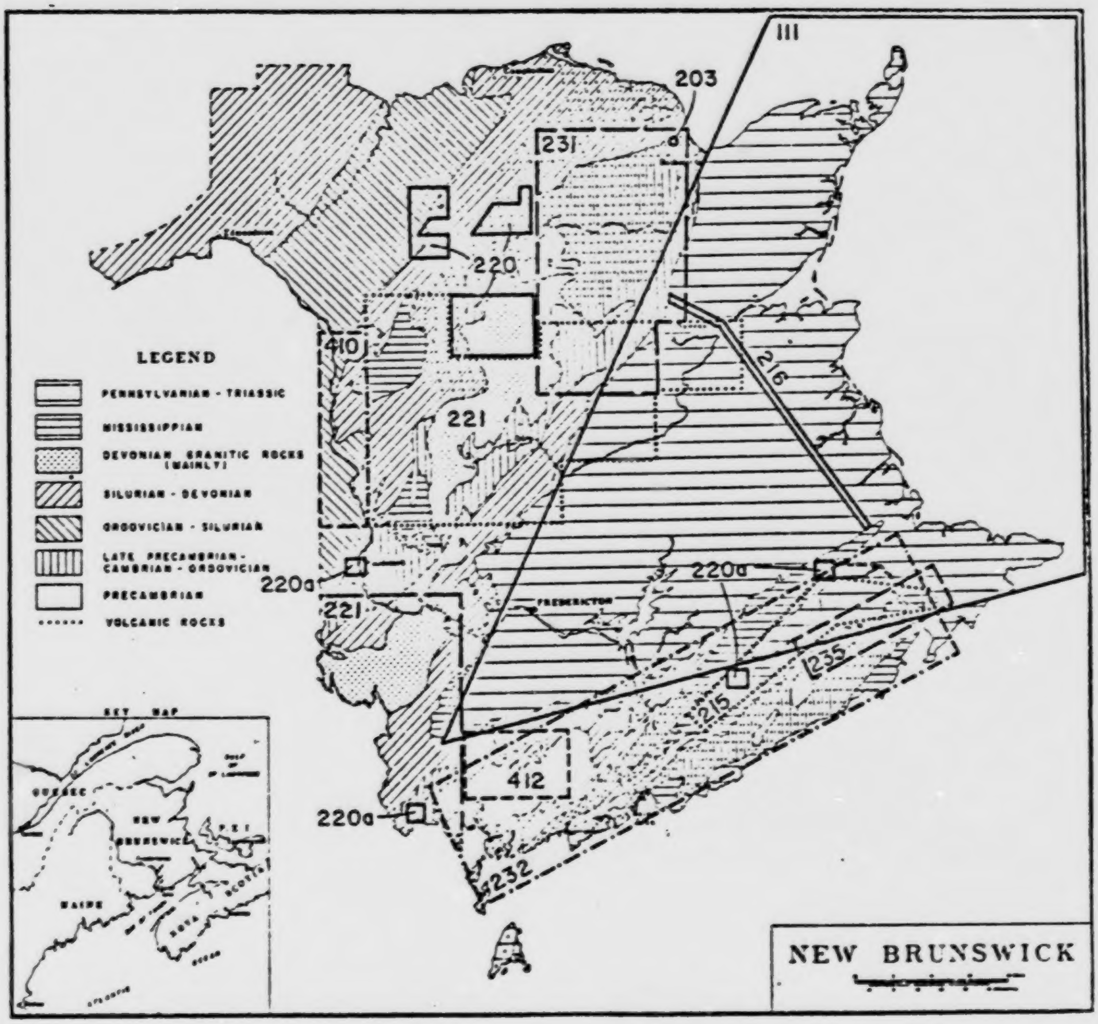

III
203
231
220
410
LEGEND
PENNSYLVANIAN - TRIASSIC
MISSISSIPPIAN
DEVONIAN GRANITIC ROCKS (MAINLY)
SILURIAN - DEVONIAN
ORDOVICIAN - SILURIAN
LATE PRECAMBRIAN - CAMBRIAN - ORDOVICIAN
PRECAMBRIAN
VOLCANIC ROCKS
216
221
220a
220a
221
FREDERICTON
235
215
412
220a
232
KEY MAP
QUEBEC
NEW BRUNSWICK
P.E.I.
MAINE
NOVA SCOTIA
NEW BRUNSWICK

Figure 7. Mineral Resources Division projects for 1981-1982: 111 (Carboniferous evaluation), 215 (gravity survey), 216 (seismic survey), 220 (geochemical survey), 221 (aggregate resources inventory), 231 (northern N. B. metals study), 232 (southern N. B. metals study), 235 (Albert oil shales study), 410 (bedrock mapping), 203 (core storage), 412 (base map production), 220a (prospecting courses)

MINERAL RESOURCES DIVISION

The main functions of the Mineral Resources Division include the administration of the Mining Act, Oil and Natural Gas Act, Bituminous Shale Act, Quarriable Substances Act, Pipeline Act, Underground Storage Act and Ownership of Minerals Act, and the collection and publication of geoscience data on the non-renewable resources of the province.

Responsibilities:

1. administration of the following acts: Mining Act, Ownership of Minerals Act, Oil and Natural Gas Act, Bituminous Shale Act, Quarriable Substances Act, Underground Storage Act, Pipeline Act, Mining Income Tax Act. This includes all matters related to granting of exploration-development rights, negotiation of agreements, collection of fees, maintaining geotechnical files, inspections, etc.,

2. geological, geochemical and geophysical surveys (a) to assess the province's mineral potential; (b) to promote and attract exploration-development capital to the province; (c) to provide technical advice and reports to government, industry and the general public; and (d) to provide basic data for land-use planning,

3. to maintain a detailed inventory of the province's metallic, industrial mineral, energy and construction material resources; and to ensure optimum development, recovery and utilization of these resources; including the rehabilitation of mine areas,

4. to collect royalties and mining taxes related to mineral resource production (Table 5),

5. to collect and maintain statistical data on all aspects of the exploration, production and marketing of New Brunswick's mineral resources.

Organization:

The Mineral Resources Division is one of five divisions of the Department of Natural Resources (see Figure 8). Mineral Resources consists of two branches--the Geological Surveys Branch and the Mineral Development Branch, and two sections--Administration and Mineral Lands (see Figure 9).

ADMINISTRATION SECTION

The operating budget for the Mineral Resources Division for the fiscal year 1981-82 amounted to $1,164,650, which represented a 21 per cent increase over the previous year. This amount breaks down as follows: 76 per cent personal services, 18 per cent other services, 5 per cent materials and supplies, and 1 per cent property and equipment.

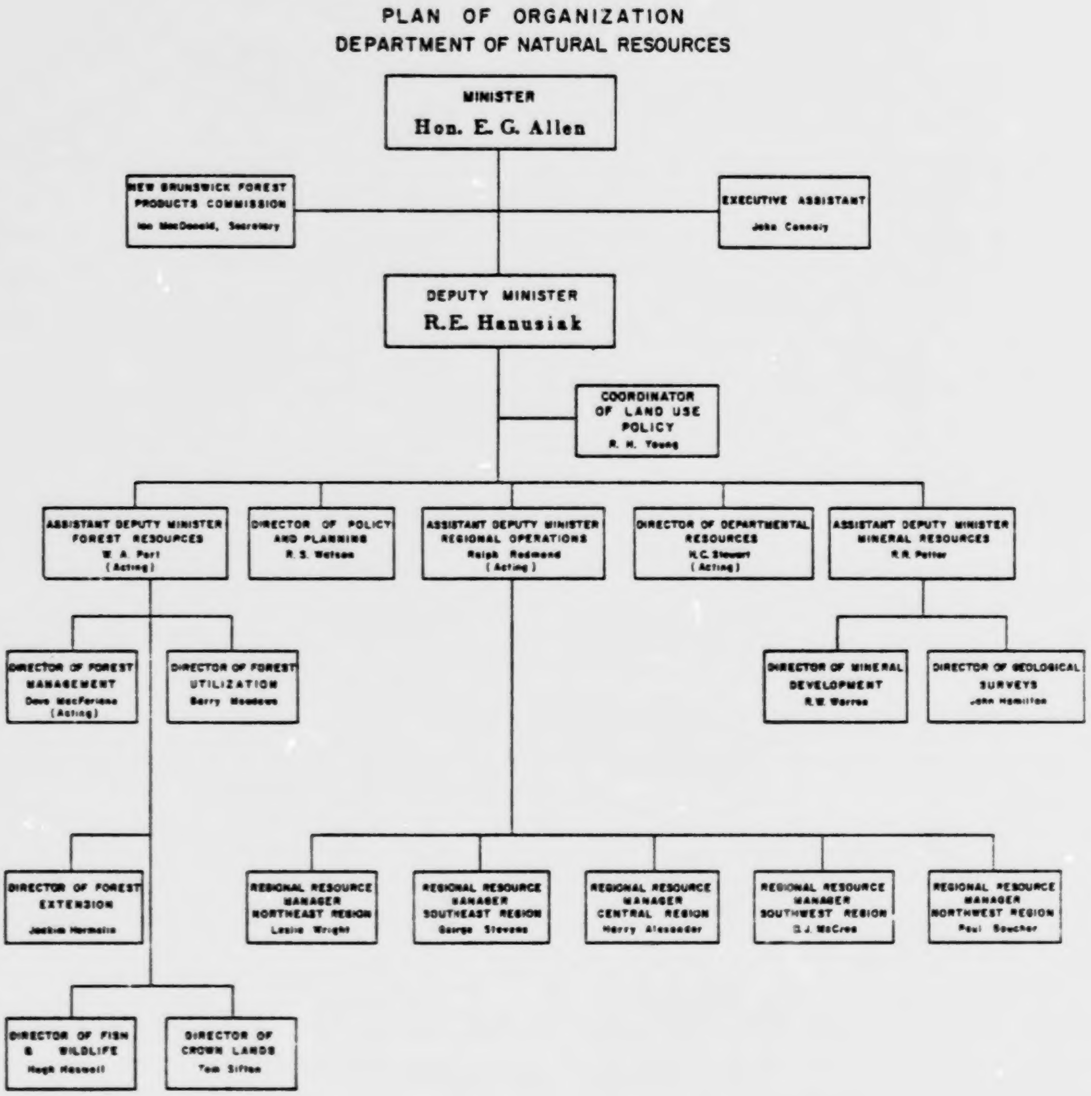

PLAN OF ORGANIZATION
DEPARTMENT OF NATURAL RESOURCES
MINISTER
Hon. E. G. Allen
NEW BRUNSWICK FOREST PRODUCTS COMMISSION
Ian MacDonald, Secretary
EXECUTIVE ASSISTANT
John Connely
DEPUTY MINISTER
R.E. Hanusiak
COORDINATOR OF LAND USE POLICY
R. H. Young
ASSISTANT DEPUTY MINISTER FOREST RESOURCES
W. A. Port
(Acting)
DIRECTOR OF POLICY AND PLANNING
R. S. Watson
ASSISTANT DEPUTY MINISTER REGIONAL OPERATIONS
Ralph Redmond
(Acting)
DIRECTOR OF DEPARTMENTAL RESOURCES
H.C. Stewart
(Acting)
ASSISTANT DEPUTY MINISTER MINERAL RESOURCES
R.R. Potter
DIRECTOR OF FOREST MANAGEMENT
Dave MacFarlane
(Acting)
DIRECTOR OF FOREST UTILIZATION
Barry Meadows
DIRECTOR OF MINERAL DEVELOPMENT
R.W. Warren
DIRECTOR OF GEOLOGICAL SURVEYS
John Hamilton
DIRECTOR OF FOREST EXTENSION
Joakim Hermelin
REGIONAL RESOURCE MANAGER NORTHEAST REGION
Leslie Wright
REGIONAL RESOURCE MANAGER SOUTHEAST REGION
George Stevens
REGIONAL RESOURCE MANAGER CENTRAL REGION
Harry Alexander
REGIONAL RESOURCE MANAGER SOUTHWEST REGION
D.J. McCrea
REGIONAL RESOURCE MANAGER NORTHWEST REGION
Paul Boucher
DIRECTOR OF FISH & WILDLIFE
Hugh Maxwell
DIRECTOR OF CROWN LANDS
Tom Sifton

Figure 8. Plan of organization, Department of Natural Resources

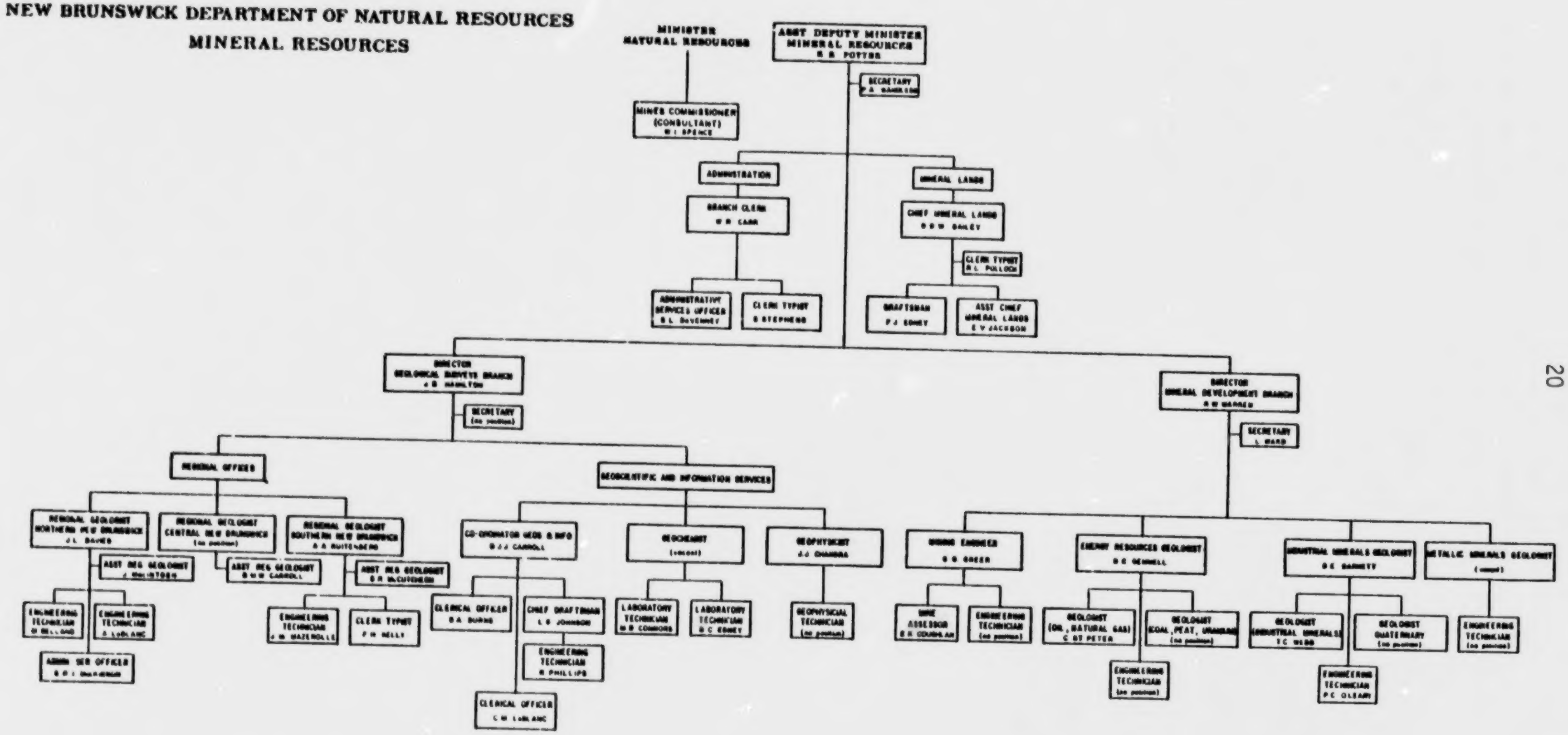

NEW BRUNSWICK DEPARTMENT OF NATURAL RESOURCES
MINERAL RESOURCES
MINISTER NATURAL RESOURCES
ASST DEPUTY MINISTER MINERAL RESOURCES R R POTTER
SECRETARY
MINES COMMISSIONER (CONSULTANT) W I SPENCE
ADMINISTRATION
BRANCH CLERK W R CARR
ADMINISTRATIVE SERVICES OFFICER B L DEVENNEY
CLERK TYPIST D STEPHENS
MINERAL LANDS
CHIEF MINERAL LANDS R D W BAILEY
CLERK TYPIST R L PULLOCK
DRAFTSMAN P J EDNEY
ASST CHIEF MINERAL LANDS E V JACKSON
DIRECTOR GEOLOGICAL SURVEYS BRANCH J B HAMILTON
SECRETARY (no position)
REGIONAL OFFICES
REGIONAL GEOLOGIST NORTHERN NEW BRUNSWICK J L DAVIES
ASST REG GEOLOGIST J McINTOSH
ENGINEERING TECHNICIAN D BELLAND
ENGINEERING TECHNICIAN A LeBLANC
ADMIN SER OFFICER
REGIONAL GEOLOGIST CENTRAL NEW BRUNSWICK (no position)
ASST REG GEOLOGIST R W W CARROLL
REGIONAL GEOLOGIST SOUTHERN NEW BRUNSWICK A A RUITENBERG
ASST REG GEOLOGIST S R McCUTCHEON
ENGINEERING TECHNICIAN J M MAZEROLLE
CLERK TYPIST F M KELLY
GEOSCIENTIFIC AND INFORMATION SERVICES
CO-ORDINATOR GEOS & INFO B J J CARROLL
CLERICAL OFFICER D A BURNS
CHIEF DRAFTSMAN L B JOHNSON
ENGINEERING TECHNICIAN R PHILLIPS
CLERICAL OFFICER C M LeBLANC
GEOCHEMIST (vacant)
LABORATORY TECHNICIAN M R CONNORS
LABORATORY TECHNICIAN D C EDNEY
GEOPHYSICIST J J CHANDRA
GEOPHYSICAL TECHNICIAN (no position)
DIRECTOR MINERAL DEVELOPMENT BRANCH R W WARREN
SECRETARY L WARD
MINING ENGINEER G G GREER
MINE ASSESSOR
ENGINEERING TECHNICIAN (no position)
ENERGY RESOURCES GEOLOGIST D E GEMMELL
GEOLOGIST (OIL, NATURAL GAS) C ST PETER
GEOLOGIST (COAL, PEAT, URANIUM) (no position)
ENGINEERING TECHNICIAN (no position)
INDUSTRIAL MINERALS GEOLOGIST D E BARNETT
GEOLOGIST INDUSTRIAL MINERALS T C WEBB
GEOLOGIST QUATERNARY (no position)
ENGINEERING TECHNICIAN P C OLEARY
METALLIC MINERALS GEOLOGIST (vacant)
ENGINEERING TECHNICIAN (no position)

Figure 9. Plan of organization, Mineral Resources Division

The section is staffed as follows: Wayne Carr, Administrative Services Officer; Sandra DeVenney, Administrative Services Officer; Carol LeBlanc, Clerical Officer; Shelley Stephens, Receptionist at Fredericton; while Freda Kelly, Clerk-Typist and Sharon McKinnon, Administrative Services Officer, are in Sussex and Bathurst respectively.

This was the sixth operating year of the Minerals and Fuels Subagreement. Budgeting for this programme and its projects is the work of a steering committee, however budget control, purchasing and staffing is the responsibility of the Mineral Resources Division, Administration Section. Funding for GDA programmes is controlled by the Community Improvement Corporation and is provided on an 80-20 basis by the Federal and Provincial governments respectively. (Tables 6 and 7)

	Spending Level	Expenditures	Difference (over or under)
Primary 3	$ 879,600.00	$ 887,120.79	($7,520.79
Primary 4	211,300.00	208,804.45	2,495.55
Primary 5	55,800.00	53,576.66	2,223.34
Primary 6	15,000.00	15,145.78	(145.78)
Primary 8	-----	3.00	(3.00)
TOTAL	$1,161,700.00	$1,164,650.68	($2,950.68)

We were overspent by $2,950.68 which represents only one-quarter of 1 per cent of the total budget. The major over-expenditure was in Primary 3 and was due to wage settlements being paid before the end of the fiscal year.

The total expenditures for the Mineral Resources Division, including GDA budgets, is as follows:

BUDGET	VOTE	EXPENDITURES	
Minerals & Fuels	40	1,047,784.88	
GDA	58	109,746.95	
Sub-Total			1,157,531.83
Developing Regions	40	210,669.70	
	58	32,847.27	
Sub-Total			243,516.97
Total GDA			1,401,048.80
Prov. Budget	19	1,164,650.68	
Sub-Total			1,164,650.68
GRAND TOTAL		2,565,699.48	2,565,699.48

Note: Vote 40 is for ordinary account under GDA agreements while Vote 58 is for Capital Expenditures under GDA agreements. Vote 19 is the ordinary account for Provincial Budgets.

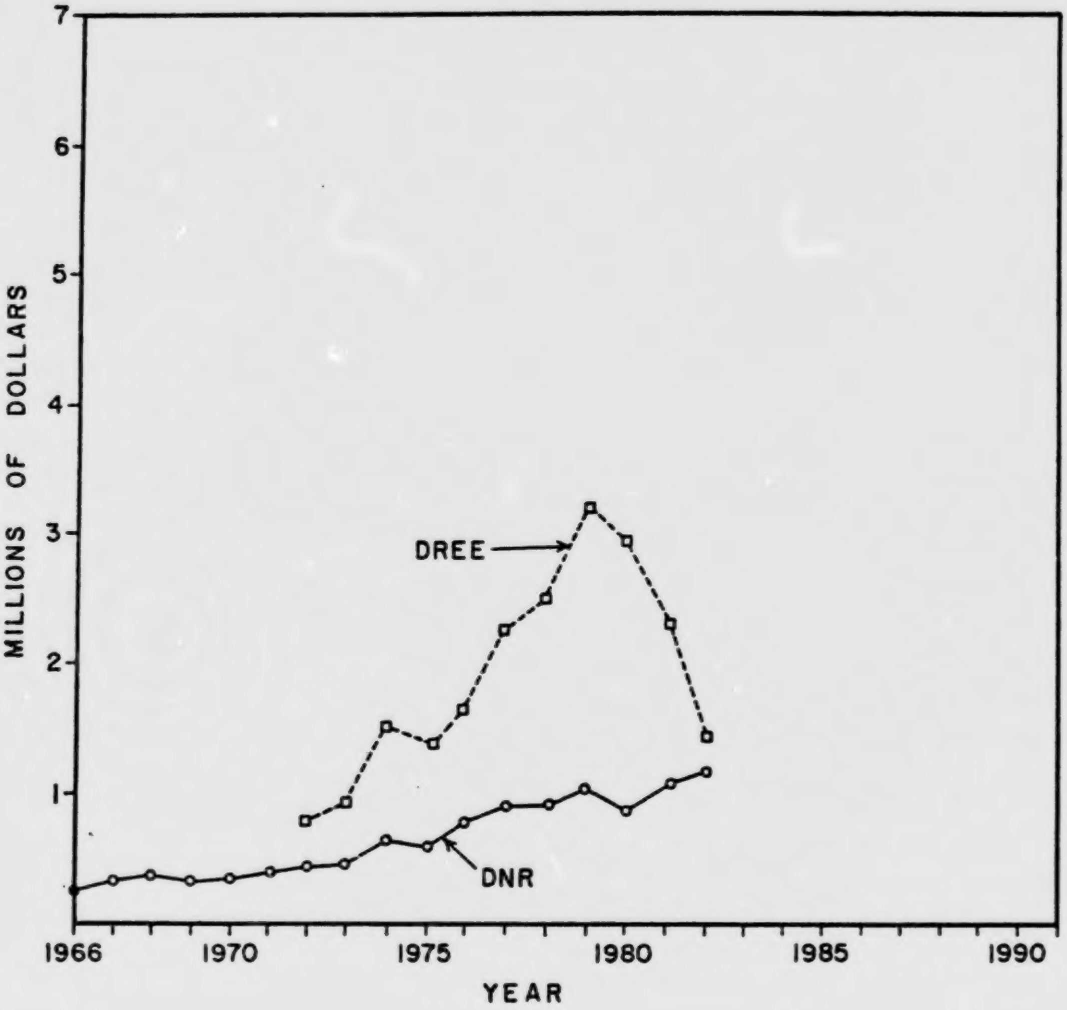


Figure 10. Budget of Mineral Resources Division 1966-1982

MINERAL LANDS SECTION

The Mineral Lands Section prepares, processes and maintains records pertaining to the disposition and status of Crown-owned minerals. Mining claims are recorded at Fredericton and the Regional Office at Bathurst.

The Mineral Lands staff consists of L. S. O'Leary, Chief; D.D.W. Bailey, Administrative Services Officer; Fred Edney, Draftsman; and Mrs. Rhonda Pollock, Clerk-Stenographer, and at the Bathurst Regional Office, Mrs. Sharon McKinnon.

Table 8

Mineral Lands Statistics for 1981

	No.	Claim Equivalent	Hectares	% Inc. Over Prev. Year (Decrease)
Prospecting Licences Sold	436			(9.7)
Claims Recorded	5,115		82,862	(29.7)
Claims Renewed	13,599		220,300	(21.5)
Claims Expired	4,345		70,388	(7.8)
Claims Converted		397	6,431	(21.4)
Licences Renewed		10,426	168,898	153
Licences Expired		48	778	41.5
Leases in Effect		397	6,431	No change
Total Claims or Claim Equivalents in Effect		29,934	484,922	127.4
Potash Leases	3	2,359	38,192	No change
Oil-Gas Licences	32		215,019	13
Oil-Gas Leases	1		2,157	No change
Bitminous Shale Licences	1		29,000	(85)
Bituminous Shale Leases	-	-	29,200	100
Underground Storage Licences	-		-	(100)
Underground Storage Leases	-	-	-	-
Quarry Permits	258	-	-	9.3
Quarry Leases	5	-	254.8	25
Peat Licences	4		1,310	34
Peat Leases	15		7,053	13
Assessment Reports Submitted		136		5.4
Value of Assessment Reports Received		$5,094,647		39.8
Drill Footage		192,702		87
(see also Table 9, appendix)				

GEOLOGICAL SURVEYS BRANCH

The Geological Surveys Branch was formally established in 1980, although it actually came into existence following the introduction of the Mining Act in 1927. In 1928 Dr. W. J. Wright was appointed Provincial Geologist, and over the years initiated many of the functions that have now become the responsibility of the Geological Surveys Branch. The rather rigid distinction that existed in the early days in the roles of the Geological Survey of Canada, the "university" and the provincial government with respect to mineral resources has been blurred in recent years. Formerly the Geological Survey of Canada tended to restrict its activities to regional matters, the "university" to academic matters and the Department of Lands and Mines to economic geology, mine safety and resource administration. With the increasing importance and potential importance of mineral resources to the provincial economy, and the changing geoscientific priorities of the Geological Survey of Canada to other parts of the country, the Department of Lands and Mines responded by expanding, beyond its traditional role, the scope of its activities. In the mid-1960's, using provincial funds, and through the hiring of technical specialists, embarking on basic data-gathering projects, establishing regional geological offices, etc., the Department of Natural Resources was able to meet the added responsibilities that had first arisen out of the finds in the Bathurst-Newcastle camp a decade or so earlier.

The prime responsibility of the Geological Surveys Branch is for the collection and dissemination of information concerning all aspects of New Brunswick's geology and encouraging exploration, discovery and the wise use of mineral deposits. This role is particularly useful to those engaged in developing the mineral industry of the province, but it is also highly significant to those who must develop sound resource policies and in planning the wise use of land. Although most of the information gathered by the Geological Surveys Branch is primarily used for mineral exploration, knowledge of geology is increasingly being used as a basis for land use planning, environmental assessment, groundwater resource studies and engineering purposes. The overall objectives of the Branch are to provide a complete, up-to-date and comprehensive inventory and analysis of geology and mineral deposits of New Brunswick, to stimulate exploration and facilitate sound planning in all matters related to mineral and earth resources. Special emphasis is placed on:

- Collecting and disseminating geoscience information and identifying potential mineral resource areas.

- Maintaining and providing comprehensive information about the nature, extent and amount of New Brunswick's known mineral deposits.

- Identifying and analysing geological features and processes affecting land use, urban development, etc.

- Encouraging and promoting public understanding and participation in mineral exploration by providing information. about geology and mineral prospecting to the general public.

Bathurst Regional Office

The Bathurst Regional Office is staffed by J. L. Davies, Regional Geologist; J. A. MacIntosh, Assistant Regional Geologist; Sharon McKinnon, Administrative Officer; Maurice Belland, Technician; and André LeBlanc, Technician.

The main activities of the Bathurst Regional Office in 1981 were made possible by funds from the Minerals Sub-agreement.

NORTHERN NEW BRUNSWICK METALS PROJECT This project began in 1977. The aim was to gather geoscience data on known sulphide deposits and their environment. It was envisaged that the project could be carried out by graduate students seeking M.Sc. or Ph.D. thesis problems. Phase I, involving the belt of rocks hosting the Restigouche, Murray Brook and Caribou massive sulphide deposits, was carried out by Darrell Rankin. His work is now complete and will be available soon as a Mineral Resources Branch publication.

Phase II comprises two sub-projects (Figure 11); (1) the Nine Mile Brook (NMB) and Flat Landing Brook (FLB) sulphide deposits involving Taras Bryndzia, University of Toronto, and (2) the Stratmat (Cominco) and Heath Steele sulphide deposits involving Leo Owsiacki, University of New Brunswick.

Geological maps (1:5000) covering the Stratmat are now available on open file. A report covering the project is expected by early 1982.

AEROMAGNETIC MAPS J. J. Chandra and J. W. Wallace have produced 120 Residual and First Derivative aeromagnetic maps covering the Bathurst-Newcastle district. The maps were derived from digitally recorded aeromagnetic data obtained by the Geological Survey of Canada in 1972. This work, also funded through the Northern New Brunswick Metals Project, is described elsewhere in this publication.

GEOLOGICAL MAPPING MAP-AREA 0-9 Geological mapping by J. A. MacIntosh is a continuation of that carried out by R. Morgan and L. Davies in 1979 and 1980 (Figure 12). The writer began his mapping on a spot-check basis along bush roads, but discrepancies in lithology as shown on available maps led to a more detailed approach. Nine square miles of the southeast corner of area 0-9 were covered. Figure 13 shows the outcrops examined and the initial interpretation of the lithology.

The northern four fifths of the section is in basic volcanic rocks, limited outcrop size and strong schistosity, generally making the distinction between flows and tuffs difficult. Good to poor pillows and well-bedded, fine-grained sediments and chert were found in several areas. Fine magnetite is present in a large number of the outcrops and may be limited to the sedimentary rocks and tuffs. A small area of what appears to be volcanic, explosive breccia of mixed lithology is outlined provisionally near the centre of the basic volcanic zone.

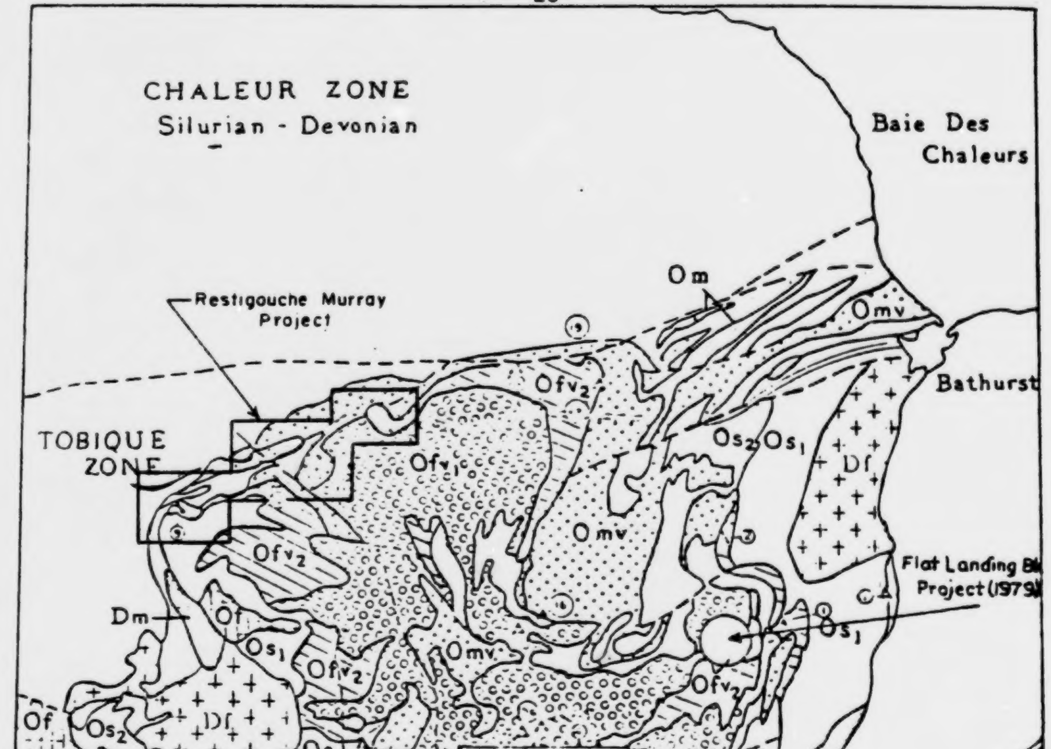

CHALEUR ZONE
Silurian - Devonian
Baie Des Chaleurs
Restigouche Murray Project
TOBIQUE ZONE
Om
Omv
Bathurst
Ofv2
Ofv1
Os2
Os1
Df
Omv
Flat Landing Bk Project (1979)
Dm
Of
Heath Steele Stratmat Project (1979)
Jurassic Diabase Dyke
PENNSYLVANIAN PLATFORM
ROAD TO RESOURCES
FAULT
IMPORTANT SULPHIDE DEPOSIT
(See list elsewhere)
0 5 10 15 KM
0 5 10 MILES
J.L. Davies 1979

FIGURE 11. GEOLOGY OF THE MIRAMICHI ZONE (NORTH), NEW BRUNSWICK

Intrusive Rocks

Devonian
- Df granitic rocks
- Dm gabbroic rocks

Ordovician
- Of metagranite
- Om metagabbro

Tetagouche Group

Ordovician
- Os_2 younger metasedimentary unit
- Omv mafic metavolcanic unit
- Ofv_2 felsic porphyritic metavolcanic unit
- Ofv_1 metarhyolitic rocks
- Os_1 older metasedimentary rocks

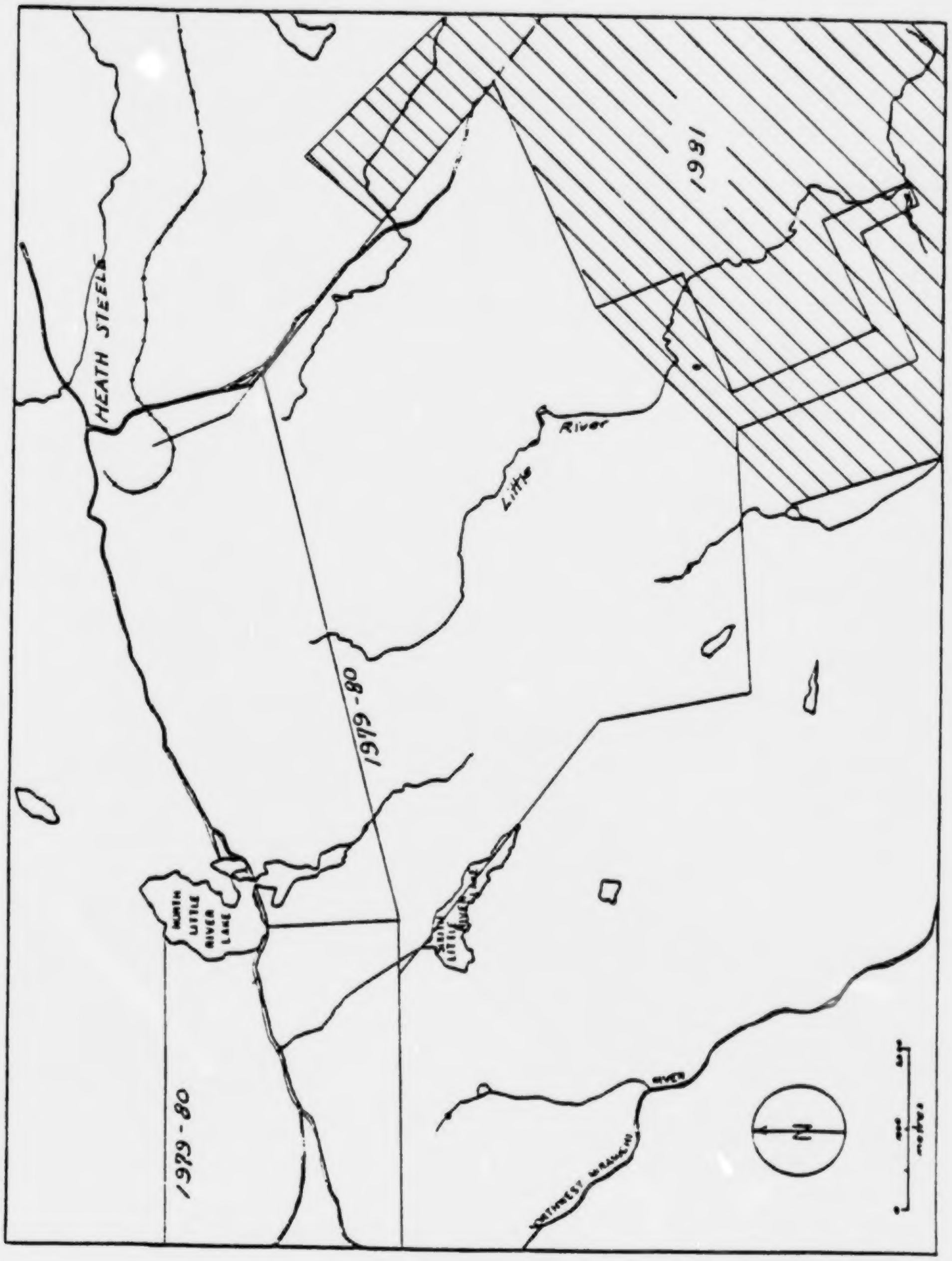
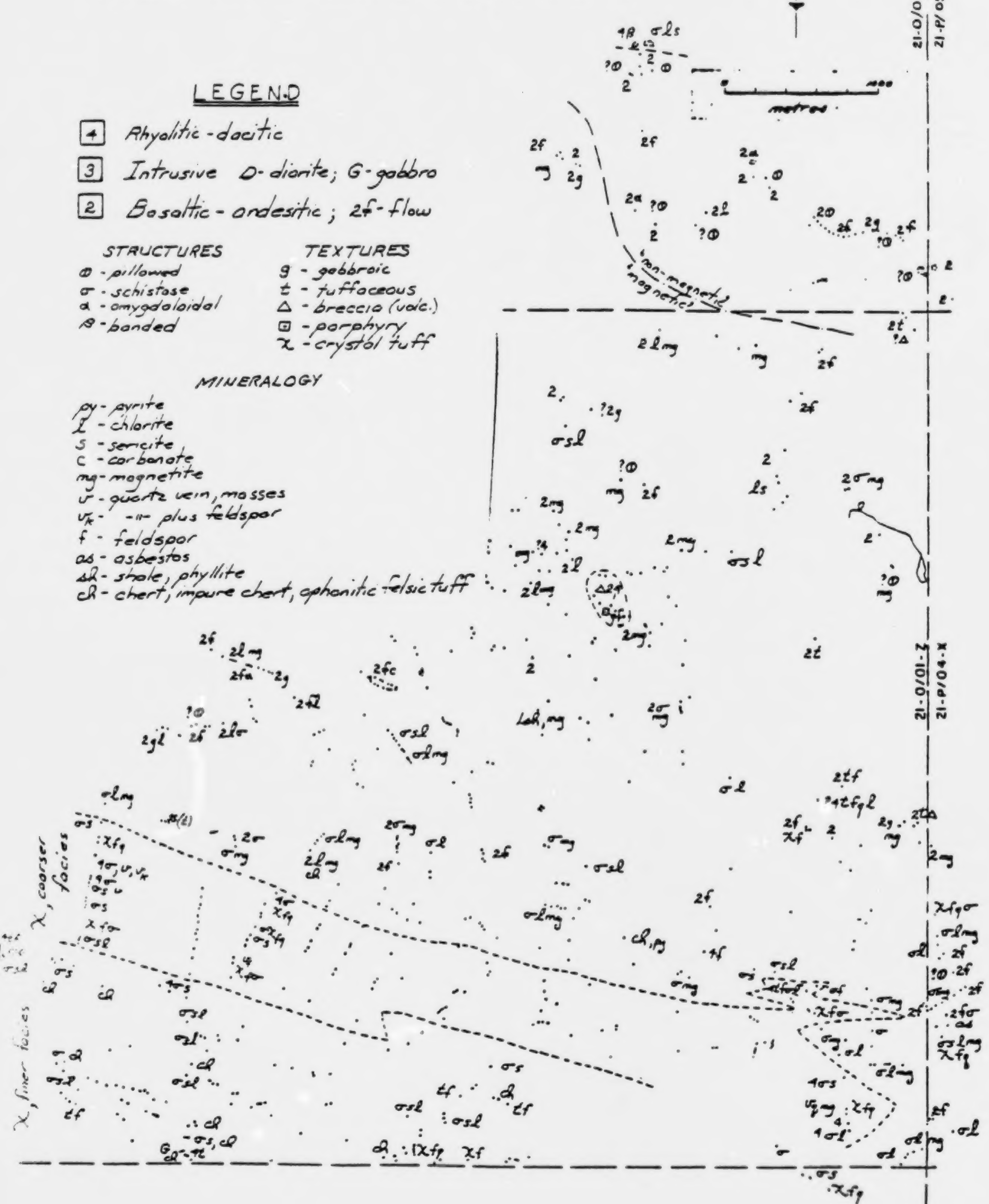

HEATH STEELE
Little River
1981
1979-80
1979-80
NORTH LITTLE RIVER LAKE
SOUTH LITTLE RIVER LAKE
NORTHWEST MIRAMICHI RIVER
N
0
metres

Figure 12. Area mapped within 0-9 map-sheet, 1981

Figure 13. Detailed outcrop map of part of 0-9, 1981


N
21-O/08-T
21-P/05-R
metres
LEGEND
4 Rhyolitic-dacitic
3 Intrusive D-diorite; G-gabbro
2 Basaltic-andesitic; 2f-flow
STRUCTURES
⊕ - pillowed
σ - schistose
α - amygdaloidal
β - banded
TEXTURES
g - gabbroic
t - tuffaceous
Δ - breccia (volc.)
⊡ - porphyry
χ - crystal tuff
MINERALOGY
py - pyrite
ℓ - chlorite
s - sericite
c - carbonate
mg - magnetite
υ - quartz vein, masses
υf - -"- plus feldspar
f - feldspar
as - asbestos
sh - shale, phyllite
ch - chert, impure chert, aphanitic felsic tuff
non-magnetic
magnetic
21-O/01-Z
21-P/04-X
χ, coarser facies
χ, finer facies

The southern fifth of the section is underlain by felsic tuffs and crystal tuffs and cherty sedimentary rocks. Magnetite is rare. Relations between these felsic, tuffaceous and the basic volcanic rocks require further study. At present the felsic rocks appear to interfinger over a short distance with the basic flows and magnetite-bearing sediments.

Other than apparently minor, gabbroic sills or dykes within the basic volcanic zone, the only intrusive rocks found were three narrow sills of gabbro-diorite in the zone of felsic rocks. The largest of these appears to be a sill of medium-grained meta-gabbro, probably less than 30 m (100 feet) thick, near the south limit of the area.

No mineralization of economic interest was discovered. Magnetite was the most widespread and abundant metallic mineral observed and is described above. Pyrite, more widespread than magnetite, was found as frequently in the felsic as in basic volcanic rocks, but only as minor amounts and as single crystals. In a few places it was seen as very fine grained to aphanitic lenses and streaks. Quartz masses about 1 m (4 feet) across were found (two pieces as float and one in place). No metallic mineralization accompanied the quartz. Asbestos was found as short veinlets, 0.6 cm wide (¼ inch) across, both slip and cross-fibre, in a few outcrops. The occurrence is in what appears to be basic flows, somewhat paler than average for the area, just east of the limit of the area near the southeast corner, north of Little River. Chemical analyses for major and minor elements are to be carried out and may be useful in sub-dividing the basic volcanic unit.

A large volume of structural data was collected, but has not been plotted as yet. Most bedding dips steeply to vertical, except in the northern portion of the basic volcanics where pillows indicate moderate dips southeast.

Overburden appears to be relatively shallow over most of the area, perhaps averaging less than five feet. Glacial striae generally trend between 70° and 90°. On the south boundary of the area a large outcrop has glacial striae and channels with numerous indications of smoothing and plucking that indicate that the ice moved from the NE.

CORE STORAGE Plans are now well advanced for the erection of a permanent prefabricated steel building to be constructed at the Madran Tree Nursery. The new building will have space for 300 to 400 thousand feet of diamond drill core and a small laboratory and office. It is hoped that the building will be ready for use sometime in 1982.

SILURIAN-DEVONIAN ZONE Interest has been growing in the Silurian-Devonian zone for the last few years. Numerous metallic mineral showings are known but only a few of interesting size have been found. Exploration in the Silurian-Devonian belt has not been intense because it is generally accepted that formation of massive sulphides of the Brunswick type calls for an initial deep submarine environment. The apparently ubiquitous sub-aerial volcanics and shallow marine sediments in the Silurian-Devonian terrane are therefore not encouraging indications. Recent studies, however, in the Irish (Mississippian) base metal deposits, suggest that local rifting in initially shallow seas, may set up the conditions necessary for the formation of massive sulphide deposits. Such rifting may have taken place in northern New Brunswick late in Silurian and Devonian time. The search for local graben-horst systems may therefore prove profitable.

The Regional Geologist began a modest program in 1981 to look at the possibilities. The initial work centred around the several showings at Nash Creek, Big Hole Brook and McNair Brook. One of the initial findings was the presence of a large ring structure (caldera?) approximately 64 km in diameter nestled between the Grand Pabos fault on the Gaspé and the Rocky Brook-Millstream fault on the south. Two smaller ring structures appear inside the larger structures. The Zn-Pb-Ag vein sulphide showings occur along the eastern perimeter of the structure although geochemical anomalies and minor showings on the western perimeter have attracted attention in the past (Figure 14).

Fredericton Regional Office

The Fredericton Regional Office operated at a reduced level during the year. B.M.W. Carroll acted as Assistant Regional Geologist.

PROGRAMMES The major activities within the Fredericton Regional Office during the year, in addition to supplying exploration-related data to companies and individuals, consisted of work related to the provision of sample identification and limited analytical services to the general public, the production of mineral occurrence reports, the editing and publication of Division reports, the organization of an Annual Review of Activities, etc.

Bedrock mapping was carried out at 1:50,000 scale in the Aroostook, Andover and Florenceville (21 J/13, 21 J/12 and 21 J/05) areas.

PUBLICATIONS The following publications were released in 1981:
CROUSE, G. W. 1981. Geology of parts of Burnthill, Clearwater and McKiel Brooks map-areas K-14, K-15 and K-16 (parts of 21 J/15 and 21 J/10). Min. Res. Div., Dept. Nat. Res., Map Report 81-5.

CROUSE, G. W. 1981. Geology of Napadogan and Miramichi Lakes (map-area K-17) and Napadogan, Rocky, McLean and Ryan Brooks (map-area K-18) (part of 21 J/07W). Min. Res. Div., Dept. Nat. Res., Map Report 81-8.

FYFFE, L. R., PAJARI, G. E. and CHERRY, M. E. 1981. The Acadian plutonic rocks of New Brunswick. Maritime Sediments and Atlantic Geology, 17, pp. 23-26.

IRRINKI, R. R. 1981. Geology of Rocky, Sisters and Clearwater Brooks-Todd Mountain region, map-areas L-14, L-15 and L-16 (parts of 21 J/10 and 21 J/15), York and Northumberland Counties. Min. Res. Div., Dept. Nat. Res., Map Report 81-7.

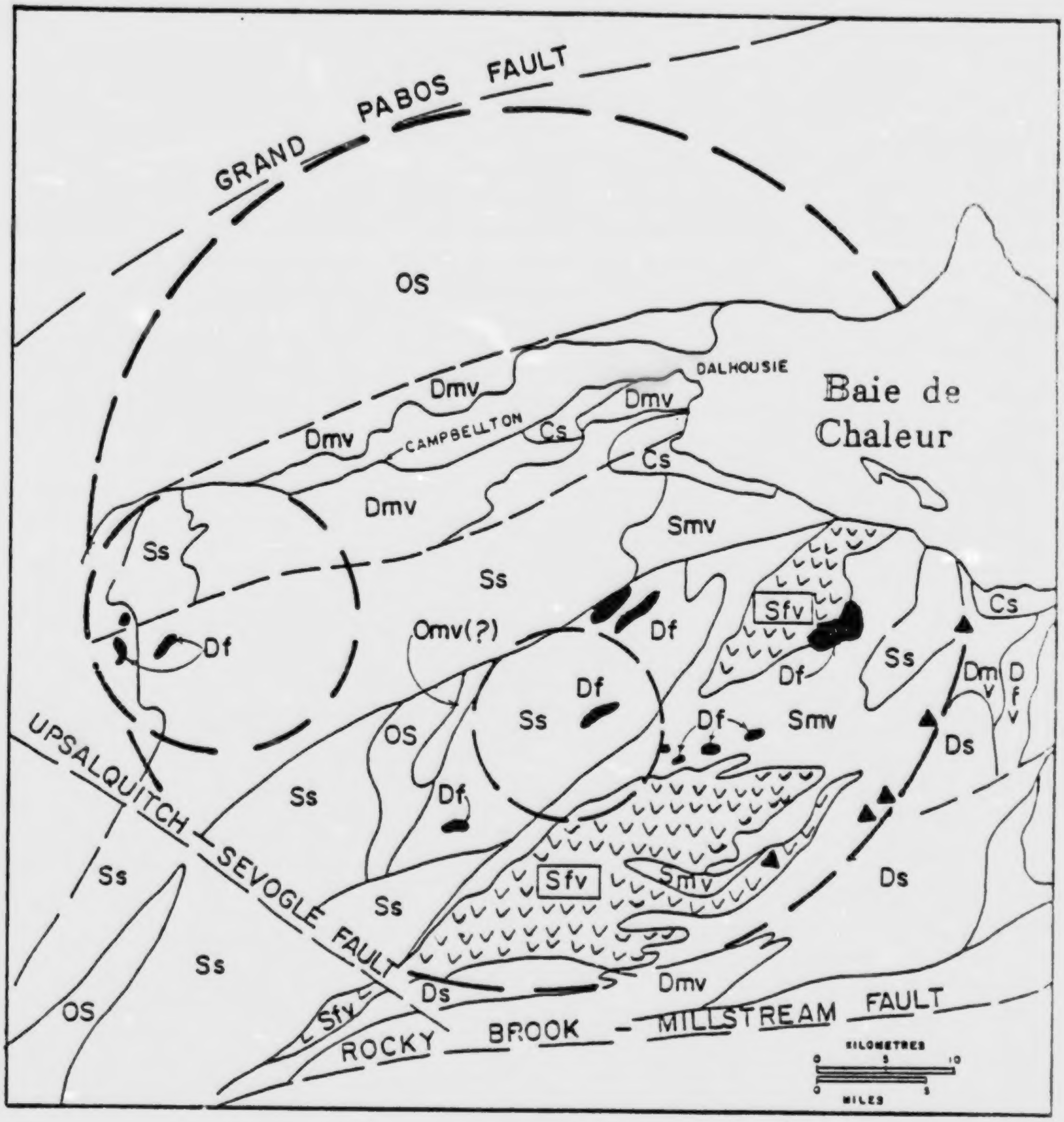

GRAND PABOS FAULT
OS
Dmv
DALHOUSIE
Dmv
Baie de Chaleur
Dmv
CAMPBELLTON
Cs
Cs
Dmv
Smv
Ss
Ss
Sfv
Cs
Omv(?)
Df
Df
Ss
Dm v
D f v
Df
Df
Ss
Smv
OS
Ds
UPSALQUITCH SEVOGLE FAULT
Ss
Df
Ss
Sfv
Smv
Ds
Ss
Ss
Dmv
Ds
OS
Sfv
ROCKY BROOK - MILLSTREAM FAULT
KILOMETRES
0
5
10
0
5
MILES

Figure 14 — SKETCH SHOWING RING STRUCTURES IN THE SILURIAN-DEVONIAN VOLCANIC TERRANE, NORTHERN NEW BRUNSWICK.

Cs - Carboniferous Df - granitic rocks
Ds - Devonian sediments, Dfv - Devonian felsic volcanics
Dmv - Devonian mafic volcanics; Ss - Silurian sediments
Sfv - Silurian felsic volcanics; Smv - Silurian mafic volcanics
OS - Ordovician-Silurian sediments; Omv - Ordovician mafic volcan
▲ Zn-Pb-Cu-Ag vein deposit

VENOGOPAL, D. V. 1981. Geology of Hartland-Woodstock-Nortondale region, map-areas H-19, H-20, I-20 (parts of 21 J/03, 21 J/04, 21 J/05, 21 J/06). Min. Res. Div., Dept. Nat. Res., Map Report 81-6.

LUTES, G. 1981. Geology of Deersdale-Head of Nashwaak River Map-area J-17 and Upper Parts of Nashwaak River-McBean and Sisters Brooks, Map-area J-18 (part of 21 J/06). Min. Res. Div., Dept. Nat. Res., Map Report 81-4.

Sussex Regional Office

The Sussex Regional Office staff consists of A. A. Ruitenberg, Regional Geologist; S. R. McCutcheon, Assistant Regional Geologist; M. R. Mazerolle, Engineering Technician and Mrs. Freda H. Kelly, Clerk-Typist. P. G. Chiswell was hired on a contract to carry out detailed geologic mapping in the eastern part of the St. George Batholith (sponsored by the Canada Department of Regional Economic Expansion).

PROGRAMMES S. R. McCutcheon completed a detailed study of the stratigraphy and paleogeography of the Windsor Group in southern New Brunswick. The results were submitted as a Master of Science thesis at Acadia University and published as an Open File Report of the Geological Surveys Branch. The objectives were to show the facies relationships within the Windsor Group and the distribution of mineral deposits, in particular salt and potash, with respect to these facies.

Major conclusions resulting from this work are as follows: 1) almost all the Windsor rocks in southern New Brunswick belong to Subzone A of the Windsor Group; 2) the Cumberland Subbasin was essentially landlocked, except to the northeast, at the time of Windsor deposition; 4) the Marysville Subbasin, part of what was previously called The Central Platform or Central Basin, contains Windsor rocks in the subsurface at least as far north as the Fredericton Fault; 5) all of the high-calcium limestone and most of the base metal sulphides in the Windsor Group are found in shallow water, basement-fringing algal buildups or "reefs"; 6) the salt and potash are deep water deposits which are found near the axes of major synclines, originally the deepest parts of syndepositional troughs; 7) the salts are flanked by and laterally equivalent to sulphate or sulphate-bearing rocks--rapid facies changes are to be expected; 8) evaporites overlie very thin to thinly bedded euxinic limestone but not the basement-fringing algal buildups.

P. G. Chiswell made a detailed study of the Carboniferous multiphase pluton that constitutes the eastern St. George Batholith. The objective of this study was to relate the occurrences of tungsten, molybdenum and tin minerals to the various granitic phases. The earliest phase of this intrusion is a coarse-grained, seriate, biotite granite. This early intrusive phase occupies the largest volume in the complex, and it is cut respectively by: a) brown to moderate orange pink, quartz-feldspar granite porphyry; b) red to pink, hiatal, quartz-feldspar microgranite; and c) white to pink, medium-grained equigranular granite. Tin-, tungsten- and molybdenum-bearing greisen deposits occur within or along the margins of the younger phases of the complex. A detailed geologic map of the area was completed and a report is in preparation.

A. A. Ruitenberg and L. R. Fyffe completed a comparative study of mineral deposits in granitoid and related subvolcanic intrusions in New Brunswick. Contact metasomatic and vein-type copper-rich base metal sulphide deposits and porphyry copper-molybdenite deposits are related mainly to high level, intermediate composition, I-type granitoid stocks in the Matapedia-Tobique and northwest Miramichi Zones, an area underlain by relatively thin continental crust. Tungsten-molybdenum-tin ± base metal sulphide-bearing greisen deposits and antimony-quartz veins are associated with predominantly S-type granitoids and related subvolcanic intrusions ranging in age from Late Devonian to Early Carboniferous. These intrusions are found in the southern Miramichi, Magaguadavic and St. Croix Zones. The mineral deposits occur in fracture zones within or along the contacts of specialized (late) phases of these intrusions, which are characterized by high K_2O/Na_2O, Rb/Sr, Rb/Ba and low Fe, Mg, Ar and Ti contents. In addition to greisen-type tungsten deposits, tungsten (scheelite)-bearing veins occur locally in skarns associated with both S- and I-type granitoids in southwestern and northern New Brunswick. The report and accompanying map were published in the Canadian Mining and Metallurgical Bulletin.

In addition to these major investigations, several smaller projects were undertaken.

At the request of the Department of Municipal Affairs, S. R. McCutcheon, A. A. Ruitenberg and J. Thibault investigated and prepared reports on the bedrock, surficial and environmental geology of the Town of Sussex, and the Villages of Sussex Corner and Westfield. The purpose of these investigations was to delineate: a) the non-renewable resources, b) the aquifers and how to protect them from pollution, c) potential ground for waste disposal and d) the general suitability of land for agriculture, forestry and building construction (see Figure 15).

A. A. Ruitenberg and S. R. McCutcheon, in co-operation with A. K. Chatterjee and J. D. Keppie of the Nova Scotia Department of Mines, organized and led a field trip on tungsten-molybdenum, tin, antimony and uranium deposits in the Maritime Region. This trip was sponsored by the Mineral Deposits Division of the Geological Association of Canada.

A. A. Ruitenberg co-operated with H. van Groenewoud of the Maritime Forest Research Centre in developing a forest site classification for New Brunswick. The proposed classification is based upon parameters described in Table 10. The system was tested in 10-20 year old softwood plantations owned by the J. D. Irving Company in the Veneer area of northwestern New Brunswick. All the sample plots were selected on fully stocked parts of the plantations and on ground that was comparable with respect to slope aspect, position on slope and drainage. However, they were situated on distinctly contrasting regolith systems. It was found that the mean annual increments of the fully stocked plots on regolith systems overlying the Matapedia Group, the Grog Brook Group and the Temiscouata Formation were respectively: 5.92 ± 1.12 m^3/ha, 6.22 ± 1.00 m^3/ha and 3.9 ± .7 m^3/ha. The system will be tested in other parts of the province during 1982.

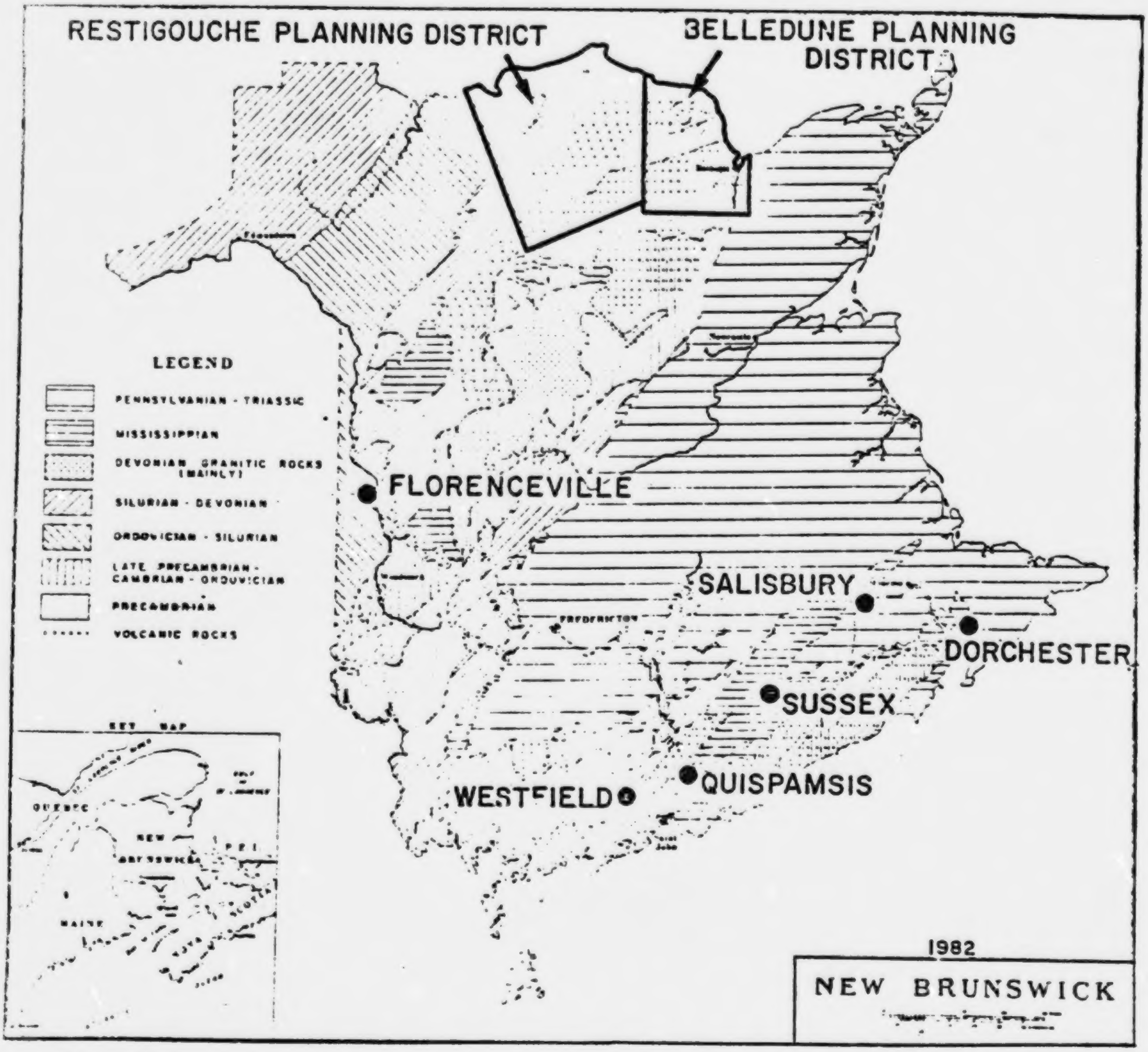

RESTIGOUCHE PLANNING DISTRICT
BELLEDUNE PLANNING DISTRICT
LEGEND
PENNSYLVANIAN - TRIASSIC
MISSISSIPPIAN
DEVONIAN GRANITIC ROCKS (MAINLY)
SILURIAN - DEVONIAN
ORDOVICIAN - SILURIAN
LATE PRECAMBRIAN - CAMBRIAN - ORDOVICIAN
PRECAMBRIAN
VOLCANIC ROCKS
FLORENCEVILLE
SALISBURY
DORCHESTER
SUSSEX
QUISPAMSIS
WESTFIELD
FREDERICTON
KEY MAP
QUEBEC
NEW BRUNSWICK
P.E.I.
MAINE
1982
NEW BRUNSWICK

Figure 15. Planning areas in which resource-related evaluations have been carried out by the Mineral Resources Division.

Table 10

Proposed Forest Site Classification for New Brunswick

1. Climatic Region	A region having a distinct climate as delineated by multivariate statistical analysis of meteorological data.	This parameter provides a broad overall control on forest growth and forms the framework for meso- and microclimatic descriptions
2. Geomorphologic District	The surface expression of a major bedrock formation or group, modified by glaciation and fluvial erosion.	This parameter provides the first order control on drainage, topography and mesoclimate. Oxygenated groundwater also removes mobile elements, including plant nutrients, directly from fractured bedrock.
3. Regolith System	a) Form and texture of landforms such as lodgement till, ablation till, outwash, alluvial, etc. b) Lithologic-mineralogic composition (including percentage of material derived from different rock units and their secondary products) and structure (cleavage and fracturing) of the rock fragments in the regolith.	These parameters greatly affect drainage and control the limits of plant nutrient production within the regolith.
4. Site Type	a) Soil profile characteristics b) Microdrainage c) Slope d) Position on slope e) Aspect f) Microclimate	a. and b. control the variation in drainage and capacity to produce plant nutrients within a regolith system. Slope and aspect are important microclimatic factors.

S. R. McCutcheon presented a paper on the potash potential of New Brunswick at the Atlantic Geoscience Society Annual Meeting at Amherst, Nova Scotia. A. A. Ruitenberg gave papers on: a) the geometry of metallic mineral zonation related to tectonic evolution of the New Brunswick Appalachians at the Geological Association of Canada Annual Meeting in Calgary and b) hydrothermal mineral deposits in New Brunswick in a symposium organized by McGill University in Montreal.

A summary of operating mines and important prospects in New Brunswick was updated.

In addition to his technical duties, M. R. Mazerolle continued a program of monitoring forest harvesting operations in the vicinity of mining claims. This project has proven to be very useful in preventing problems regarding destruction of claim boundaries and cut lines on Crown land.

CONSULTING SERVICES AND PUBLIC RELATIONS Consulting services were provided for exploration geologists, prospectors, engineers, city planners, other government departments and the general public. A number of new prospects were examined and suggestions offered for further development.

An exhibit of geologic maps and samples was prepared for the Annual Review of Activities in Fredericton. The latest results of geologic investigations on tungsten-molybdenum and tin deposits in granitoid rocks and areas favourable for future potash exploration were emphasized.

PUBLICATIONS The following publications were released:
McCUTCHEON, S. R. 1981. Stratigraphy and paleogeography of the Windsor Group in southern New Brunswick. New Brunswick Department of Natural Resources, Mineral Resources Division, Open File Report 81-31.

________________ 1981. Revised stratigraphy of the Long Reach area, southern New Brunswick: evidence for major northwestward-directed Acadian thrusting. Canadian Journal of Earth Sciences, V. 18, pp. 646-656.

McCUTCHEON, S. R., LUTES, G., GAUTHIER, G. and BROOKS, C. 1981. The Pokiok batholith: a contaminated Acadian intrusion with an anomalous Rb/Sr age. Canadian Journal of Earth Sciences, V. 18, No. 5, pp. 910-918.

McCUTCHEON, S. R. and THIBAULT, J. 1981. Environmental geology of Sussex and Sussex Corner, New Brunswick. Mineral Resources Division, New Brunswick Department of Natural Resources, Open File Report 81-39, 18 p.

McLEOD, M. J. and McCUTCHEON, S. R. 1981. A newly recognized sequence of possible Early Cambrian age in southern New Brunswick: evidence for major southward-directing thrusting. Canadian Journal of Earth Sciences, V. 9, pp. 83-87.

RUITENBERG, A. A. 1981. Geometry of metallic mineral zonation related to tectonic evolution of the New Brunswick Appalachians. Abstracts, Geological Association of Canada Annual Meeting, Calgary, Alberta, p. A-50.

_______________ and THIBAULT, J. 1981. Bedrock, surficial and environmental geology, Village of Westfield, New Brunswick. Mineral Resources Division, New Brunswick Department of Natural Resources, Open File Report 81-32, 11 p.

_______________ and FYFFE, L. R. 1982. Mineral deposits associated with granitoid intrusions and related subvolcanic stocks in New Brunswick and their relationship to Appalachian tectonic evolution. Canadian Institute of Mining and Metallurgy Bulletin, V. 75, pp. 83-97.

Geophysics

PROGRAMMES Gravity Survey: Gravity surveying was continued in the Central, Moncton and Cumberland Basins. Anomalously low gravity areas were further evaluated to provide better resolution of the shape and magnitude of each anomaly. In conjunction with the survey, rock samples were collected for density measurements. These density values were used in the computing of stratigraphic models of possible salt masses associated with the gravity lows.

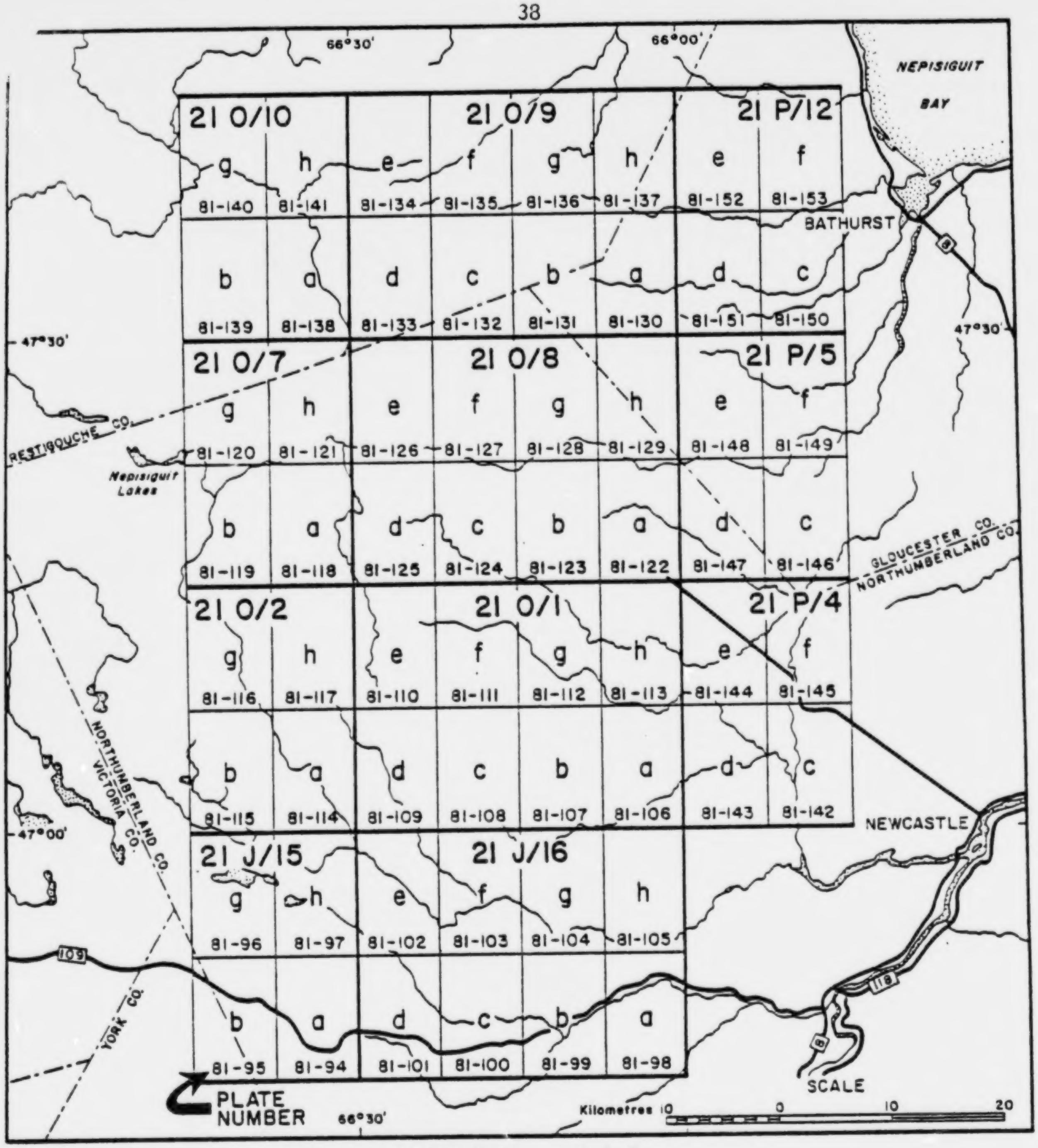
Seismic Surveys: Refraction seismic surveys were conducted in the Smithtown-Salina area. The seismic data were used to assist in the gravity modelling of the Smithtown, Salina and Salt Springs salt bodies.

LABORATORY Aeromagnetic: Bathurst-Newcastle survey. The Bathurst-Newcastle aeromagnetic survey was flown by the G.S.C. in 1972 and covered approximately 8000 km^2 in Gloucester, Restigouche and Northumberland Counties. The original survey results were published jointly by the G.S.C. and N. B. D.N.R. in 1975 as 60 "Total Field" aeromagnetic maps at a scale of 1:25,000.

In 1976, P. H. McGrath (G.S.C.) prepared several Residual and 1st Derivative maps from the 1972 data. Because of the interest shown in these maps by exploration companies, the Geological Surveys Branch (N.B.) undertook the completion of the project with the assistance of P. H. McGrath.

The method of compilation was adopted from McGrath (1975) and McGrath et al. (1976). Residual and 1st Derivative magnetic data were compiled for each of the original 60 maps at a scale of 1:20,000 (i.e. 120 maps in all) (Figure 16). These maps were published in January, 1982.

Gravity Compilation: All gravity data gathered by D.N.R., the Earth Physics Branch (E.M.R.), the University of New Brunswick and the private sector were combined to make up a compre-


66°30'
66°00'
NEPISIGUIT BAY
21 O/10
g h
81-140 81-141
b a
81-139 81-138
21 O/9
e f g h
81-134 81-135 81-136 81-137
d c b a
81-133 81-132 81-131 81-130
21 P/12
e f
81-152 81-153
d c
81-151 81-150
BATHURST
8
47°30'
21 O/7
g h
81-120 81-121
b a
81-119 81-118
21 O/8
e f g h
81-126 81-127 81-128 81-129
d c b a
81-125 81-124 81-123 81-122
21 P/5
e f
81-148 81-149
d c
81-147 81-146
RESTIGOUCHE CO.
Nepisiguit Lakes
GLOUCESTER CO.
NORTHUMBERLAND CO.
21 O/2
g h
81-116 81-117
b a
81-115 81-114
21 O/1
e f g h
81-110 81-111 81-112 81-113
d c b a
81-109 81-108 81-107 81-106
21 P/4
e f
81-144 81-145
d c
81-143 81-142
NEWCASTLE
47°00'
NORTHUMBERLAND CO.
VICTORIA CO.
21 J/15
g h
81-96 81-97
b a
81-95 81-94
21 J/16
e f g h
81-102 81-103 81-104 81-105
d c b a
81-101 81-100 81-99 81-98
109
118
8
YORK CO.
PLATE NUMBER
66°30'
SCALE
Kilometres 10 0 10 20

INDEX MAP

FILTERED RESIDUAL AND 1st VERTICAL DERIVATIVE MAPS

(compiled from 1972 G.S.C. High Resolution Airborne Mag Survey)

Scale 1:20,000

FIGURE 16

hensive network of 22,671 gravity stations. The combined data set has been compiled in a series of 1:50,000 maps covering all of New Brunswick, and includes sheets for Northumberland Strait, Bay of Fundy and adjacent parts of Quebec and Nova Scotia. The data distribution by map sheet is indicated in Figure 17. It is anticipated that these maps will be ready for publication in the summer of 1982.

Gravity modelling of the Dorchester gravity low was completed and published in "Request for Tenders for the Right to Explore and Develop a Salt-Potash Prospect in the Dorchester Area". Similar studies have been completed for gravity anomalies located at Smithtown, Salina, Salt Springs, Millstream, Plumweseep, Penobsquis, Five Points, Point de Bute, Portage Vale and Anagance. Results of modelling of these latter anomalies will be published in the spring or summer of 1982.

CONSULTING SERVICES Consulting services were provided to various engineering, exploration and mining companies active in the area. When possible, field assistance was also rendered and technical points on proper instrumentation and survey procedures were demonstrated.

PUBLICATIONS The following publications were released during the period of April, 1981-March, 1982:

CHANDRA, J. J. and WALLACE, J. W. 1981. Filtering of aeromagnetic data for Residual and Derivative maps. Bathurst-Newcastle aeromagnetic survey data 1976. Min. Res. Div., N. B. Dept. Nat. Res., Open File Report No. 81-24.

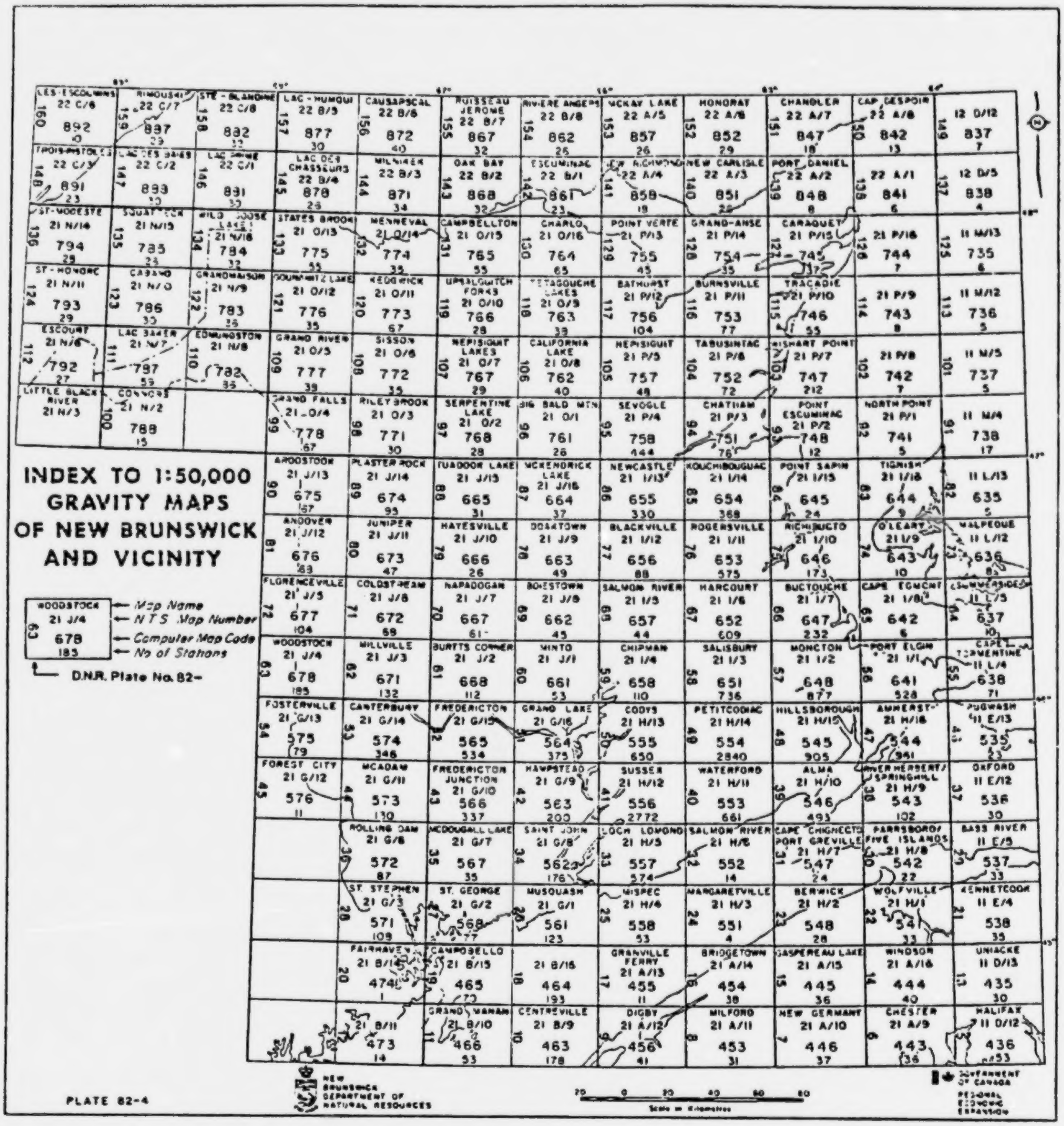
WALLACE, J. W. and CHANDRA, J. J. 1981. Filtered Residual aeromagnetic maps. Bathurst-Newcastle area. Min. Res. Div., N. B. Dept. Nat. Res., Map Plate Nos. 81-98 to 81-153 Series B.

WALLACE, J. W. and CHANDRA, J. J. 1981. Filtered 1st Vertical Derivative aeromagnetic maps. Bathurst-Newcastle area. Min. Res. Div., N. B. Dept. Nat. Res., Map Plate Nos. 81-98 to 81-153 Series C.

CHANDRA, J. J., CHANDRA, S., WALLACE, J. W. and WILLIAMS, D. 1981. Bouguer gravity anomaly maps (1:50,000) of New Brunswick and vicinity. Min. Res. Div., N. B. Dept. Nat. Res., Map Plate Nos. 81-5 to 81-160.

Geochemistry

The geochemistry section is staffed by Denise Connors, Engineering Technician, and Bettina Edney, Laboratory Assistant. V. Austria, geochemist and section head, resigned during the year and his position remained unfilled for the balance of the year.


INDEX TO 1:50,000 GRAVITY MAPS OF NEW BRUNSWICK AND VICINITY
WOODSTOCK 21 J/4 678 185 63
Map Name
N T S Map Number
Computer Map Code
No of Stations
D.N.R. Plate No. 82-
PLATE 82-4
NEW BRUNSWICK DEPARTMENT OF NATURAL RESOURCES
Scale in Kilometres
GOVERNMENT OF CANADA
REGIONAL ECONOMIC EXPANSION

Index to 1:50,000 Gravity Maps of New Brunswick and Vicinity.

FIGURE 17

FIELD ACTIVITIES Regional stream sampling was carried out in three areas (see Figure 18) in northern New Brunswick:

(a) Serpentine Lake map-area (21 O/2) on 1:50,000 scale. The area is underlain mainly by Devonian granitic rocks. These are favourable hosts for base metals, tin, tungsten, molybdenum and uranium. Field samples (1160) were collected under contract by Geosleuths Mineral Exploration Services.

(b) Portions of Sisson Branch Reservoir (21 O/6), Upsalquitch Forks (21 O/10) and Kedgwick (21 O/11) notably map-areas J-5, J-6, J-7, L-6, K-6, M-5 and M-6. These areas are underlain by Ordovician and Silurian volcanic and sedimentary rocks which are known to be favourable for Pb, Zn and Cu mineralization. Field samples (1740) were collected under contract by K.D.A. Whaley.

(c) Portions of Nepisiguit Lake (21 O/7), Popple Brook area. Follow-up work was carried out in the Popple Brook area to complete sampling in the Nepisiguit Lake area. This work was carried out under contract by Northeast Exploration Services who collected 360 samples.

LABORATORY (1) 3260 stream sediment samples were analyzed for Cu, Pb, Zn, Mn, Fe, Co, Ni, Ag and Mo; 1160 W determinations were made on samples collected in 21 O/2 map-area.

(2) 3140 rock samples from the Carboniferous Drilling Project were analyzed for Cu, Pb, Zn, Mn, Fe, Co, Ni and Ag.

In total, approximately 6400 samples were analyzed by the atomic absorption method (8 elements), and 8000 by colorimetric methods (Mo, V and W).

PUBLICATIONS The following publications were released during the year:

AUSTRIA, V. 1981. Copper content of stream and spring sediments, Nepisiguit Lakes East (21 O/7E). Min. Res. Div., N. B. Dept. Nat. Res., Plate 81-44a.

AUSTRIA, V. 1981. Lead content of stream and spring sediments, Nepisiguit Lakes East (21 O/7E). Min. Res. Div., N. B. Dept. Nat. Res., Plate 81-44b.

AUSTRIA, V. 1981. Zinc content of stream and spring sediments, Nepisiguit Lakes East (21 O/7E). Min. Res. Div., N. B. Dept. Nat. Res., Plate 81-44c.

AUSTRIA, V. 1981. Manganese content of stream and spring sediments, Nepisiguit Lakes East (21 O/7E). Min. Res. Div., N. B. Dept. Nat. Res., Plate 81-44d.

AUSTRIA, V. 1981. Iron content of stream and spring sediments, Nepisiguit Lakes East (21 O/7E). Min. Res. Div., N. B. Dept. Nat. Res., Plate 81-44e.

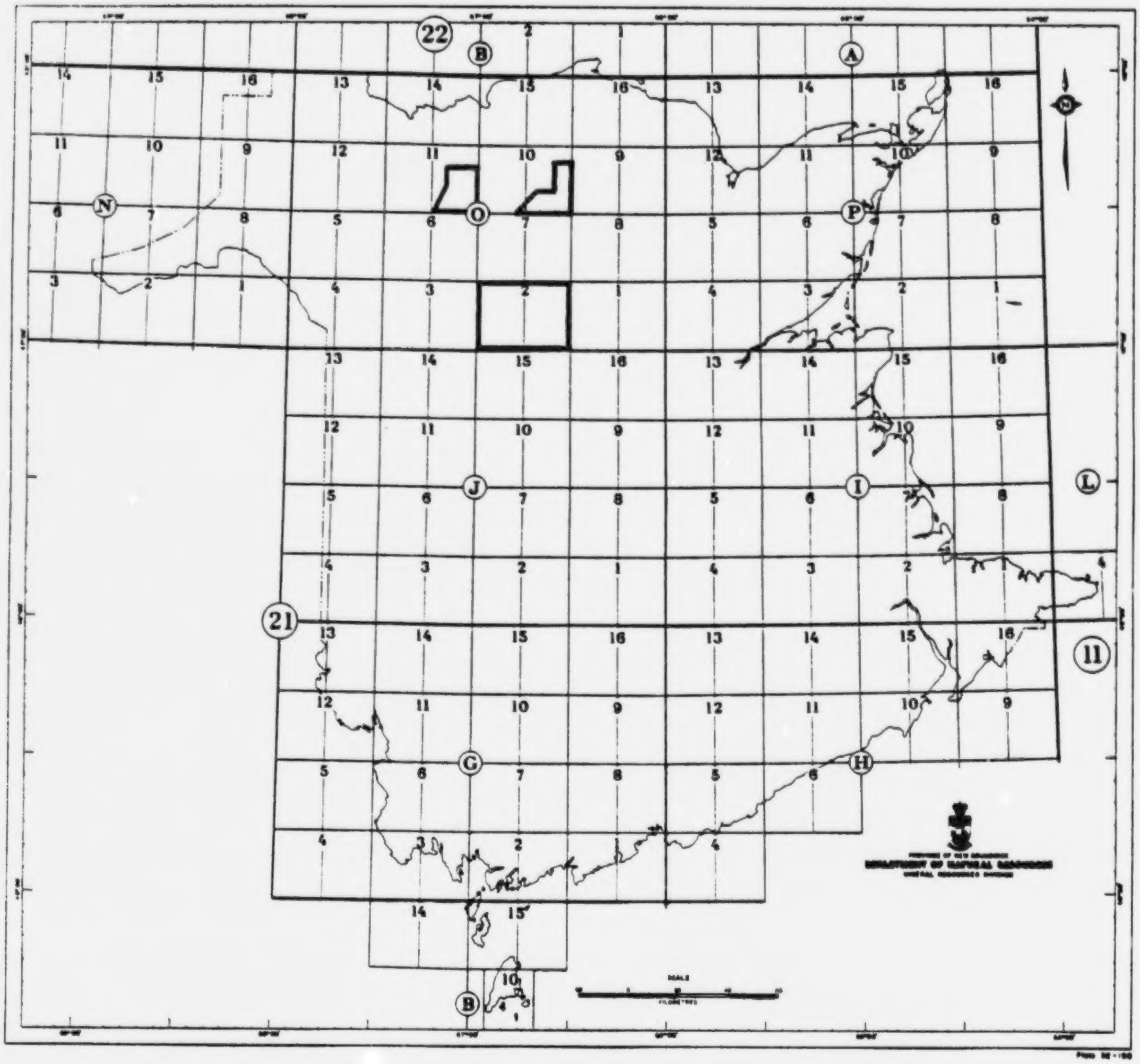

22
B
A
N
O
P
J
I
L
21
11
G
H
B

Figure 18. Areas in which geochemical silt sampling was carried out in 1981

AUSTRIA, V. 1981. Molybdenum/silver content of stream and spring sediments, Nepisiguit Lakes East (21 O/7E). Min. Res. Div., N. B. Dept. Nat. Res., Plate 81-44f.

AUSTRIA, V. 1981. Uranium content of stream and spring sediments, Nepisiguit Lakes East (21 O/7E). Min. Res. Div., N. B. Dept. Nat. Res., Plate 81-44g.

AUSTRIA, V. 1981. Copper content of stream and spring sediments, California Lake West (21 O/8W). Min. Res. Div., Dept. Nat. Res., Plate 81-45a.

AUSTRIA, V. 1981. Lead content of stream and spring sediments, California Lake West (21 O/8W). Min. Res. Div., Dept. Nat. Res., Plate 81-45b.

AUSTRIA, V. 1981. Zinc content of stream and spring sediments, California Lake West (21 O/8W). Min. Res. Div., Dept. Nat. Res., Plate 81-45c.

AUSTRIA, V. 1981. Manganese content of stream and spring sediments, California Lake West (21 O/8W). Min. Res. Div., Dept. Nat. Res., Plate 81-45d.

AUSTRIA, V. 1981. Iron content of stream and spring sediments, California Lake West (21 O/8W). Min. Res. Div., Dept. Nat. Res., Plate 81-45e.

AUSTRIA, V. 1981. Molybdenum/silver content of stream and spring sediments, California Lake West (21 O/8W). Min. Res. Div., Dept. Nat. Res., Plate 81-45f.

AUSTRIA, V. 1981. Uranium content of stream and spring sediments, California Lake West (21 O/8W). Min. Res. Div., Dept. Nat. Res., Plate 81-45g.

AUSTRIA, V. 1981. Copper content of stream and spring sediments, Tetagouche Lakes West (21 O/9W). Min. Res. Div., Dept. Nat. Res., Plate 81-46a.

AUSTRIA, V. 1981. Lead content of stream and spring sediments, Tetagouche Lakes West (21 O/9W). Min. Res. Div., Dept. Nat. Res., Plate 81-46b.

AUSTRIA, V. 1981. Zinc content of stream and spring sediments, Tetagouche Lakes West (21 O/9W). Min. Res. Div., Dept. Nat. Res., Plate 81-46c.

AUSTRIA, V. 1981. Manganese content of stream and spring sediments, Tetagouche Lakes West (21 O/9W). Min. Res. Div., Dept. Nat. Res., Plate 81-46d.

AUSTRIA, V. 1981. Iron content of stream and spring sediments, Tetagouche Lakes West (21 O/9W). Min. Res. Div., Dept. Nat. Res., Plate 81-46e.

AUSTRIA, V. 1981. Molybdenum/silver content of stream and spring sediments, Tetagouche Lakes West (21 O/9W). Min. Res. Div., Dept. Nat. Res., Plate 81-46f.

AUSTRIA, V. 1981. Uranium content of stream and spring sediments, Tetagouche Lakes West (21 O/9W). Min. Res. Div., Dept. Nat. Res., Plate 81-46g.

AUSTRIA, V. 1981. Copper content of stream sediments, Northwest Upsalquitch-Twenty-eight Mile to Chisholm Brooks (21 O/11E). Min. Res. Div., Dept. Nat. Res., Plate 81-47a.

AUSTRIA, V. 1981. Lead content of stream sediments, Northwest Upsalquitch-Twenty-eight Mile to Chisholm Brooks (21 O/11E). Min. Res. Div., Dept. Nat. Res., Plate 81-47b.

AUSTRIA, V. 1981. Zinc content of stream sediments, Northwest Upsalquitch-Twenty-eight Mile to Chisholm Brooks (21 O/11E). Min. Res. Div., Dept. Nat. Res., Plate 81-47c.

AUSTRIA, V. 1981. Uranium content of stream sediments, Northwest Upsalquitch-Twenty-eight Mile to Chisholm Brooks (21 O/11E). Min. Res. Div., Dept. Nat. Res., Plate 81-47d.

AUSTRIA, V. 1981. Copper content of stream sediments, Northwest Upsalquitch-Nine Mile to Oxford Brooks (21 O/10W). Min. Res. Div., Dept. Nat. Res., Plate 81-48a.

AUSTRIA, V. 1981. Lead content of stream sediments, Northwest Upsalquitch-Nine Mile to Oxford Brooks (21 O/10W). Min. Res. Div., Dept. Nat. Res., Plate 81-48b.

AUSTRIA, V. 1981. Zinc content of stream sediments, Northwest Upsalquitch-Nine Mile to Oxford Brooks (21 O/10W). Min. Res. Div., Dept. Nat. Res., Plate 81-48c.

AUSTRIA, V. 1981. Uranium content of stream sediments, Northwest Upsalquitch-Nine Mile to Oxford Brooks (21 O/10W). Min. Res. Div., Dept. Nat. Res., Plate 81-48d.

AUSTRIA, V. 1981. Copper content of stream sediments, Nine Mile and Oxford Brooks (21 O/10W). Min. Res. Div., Dept. Nat. Res., Plate 81-49a.

AUSTRIA, V. 1981. Lead content of stream sediments, Nine Mile and Oxford Brooks (21 O/10W). Min. Res. Div., Dept. Nat. Res., Plate 81-49b.

AUSTRIA, V. 1981. Zinc content of stream sediments, Nine Mile and Oxford Brooks (21 O/10W). Min. Res. Div., Dept. Nat. Res., Plate 81-49c.

AUSTRIA, V. 1981. Uranium content of stream sediments, Nine Mile and Oxford Brooks (21 O/10W). Min. Res. Div., Dept. Nat. Res., Plate 81-49d.

AUSTRIA, V. 1981. Copper content of stream sediments, Forks of Upsalquitch River (21 O/10). Min. Res. Div., Dept. Nat. Res., Plate 81-50a.

AUSTRIA, V. 1981. Lead content of stream sediments, Forks of Upsalquitch River (21 O/10). Min. Res. Div., Dept. Nat. Res., Plate 81-50b.

AUSTRIA, V. 1981. Zinc content of stream sediments, Forks of Upsalquitch River (21 O/10). Min. Res. Div., Dept. Nat. Res., Plate 81-50c.

AUSTRIA, V. 1981. Uranium content of stream sediments, Forks of Upsalquitch River (21 O/10). Min. Res. Div., Dept. Nat. Res., Plate 81-50d.

AUSTRIA, V. 1981. Copper content of stream and spring sediments, Charlo-Blue Mountain area (21 O/15, 16). Min. Res. Div., Dept. Nat. Res., Plate 81-51a.

AUSTRIA, V. 1981. Lead content of stream and spring sediments, Charlo-Blue Mountain area (21 O/15, 16). Min. Res. Div., Dept. Nat. Res., Plate 81-51b.

AUSTRIA, V. 1981. Zinc content of stream and spring sediments, Charlo-Blue Mountain area (21 O/15, 16). Min. Res. Div., Dept. Nat. Res., Plate 81-51c.

Geoscientific and Information Services Centre

The Geoscientific and Information Services Centre is made up of the publications, drafting, and assessment file report-microfiche sections. Presently the Centre is staffed by four individuals: D.J.J. Carroll, G. Johnson (drafting section), Mrs. S. Burns (publications section), and Mrs. C. LeBlanc (assessment file-microfiche section).

The main responsibility of the Centre is to produce, publish and disseminate geoscientific information of all types. In addition, a major role is played in assisting the users of our mineral exploration assessment report files.

During this past year, the majority of the Mineral Resources Division's mineral exploration assessment file reports were microfilmed and duplicated in microfiche format. This project, funded under the G.D.A. agreement, resulted in our two regional offices (Sussex and Bathurst) and six regional public libraries (Fredericton, Edmundston, Campbellton, Bathurst, Moncton, and Saint John) providing public and industry access to duplicate sets of our assessment report data.

In addition to the microfilm project, the Geoscientific and Information Services Centre has been involved in other G.D.A.-funded programs, notably under the "Creation of Public Awareness" program.

One of the main objectives of this program is to increase the number of individuals prospecting for mineral deposits. To accomplish this task, a six-week prospecting course was conducted by Mr. A. W. Lockhart in four centres of the Province: Moncton, Sussex, St. Stephen and Woodstock.

Another project carried out under the Creation of Public Awareness program involved the promotion of our provincial mineral resources and mining industry. This project, which had input from several mining associations and the industry itself, consisted of a manned exhibit that travelled around the Province visiting major shopping malls in Edmundston, Campbellton, Bathurst, Douglastown, Moncton, Saint John and Fredericton.

At each of the exhibit centres, students hired to conduct the promotional tour distributed literature on our provincial mineral resources (New Brunswick Mineral Heritage Brochure) and information on the various activities in which the mining industry is involved.

The public awareness tour, which was conducted during July and August, proved to be a success from the standpoint of educating the general public with regard to the importance of our mineral resources.

The Mineral Resources Division has, during the past year, also continued to index and code all incoming assessment file reports for inclusion in the national geoscientific bibliographic data file called GEOSCAN. Copies of the various indexes which have been produced from GEOSCAN are available for use by the public in our Fredericton and regional offices.

Revenue generated within the Geoscientific and Information Services Centre consisted of over $30,000 from the sale of reports, maps and other publications.

Proposed plans for the upcoming year include the microfilming of 1982 map plates as well as the commencement of work on the production of a new List of Publications.

MINERAL DEVELOPMENT BRANCH

Energy Resources

The staff of Energy Resources includes D. E. Gemmell, energy resources geologist, and Clinton St. Peter, geologist.

Projects in coal, oil and gas, uranium, peat, oil shales and other related areas have been carried out.

COAL DRILLING The finalization of the coal drilling project was completed and staff terminated September, 1981. Reports are now available from all phases of the work with the exception of minor chemical analysis of chip samples. The data obtained has been computerized and is available through the Department by way of printouts under the CARBDRIL program.

URANIUM The province continued analyses of stream sediments for uranium in the north central portion of the province.

OIL AND NATURAL GAS Continuing programs of monitoring the Stoney Creek Field and a 715 km seismic program by Chevron Irving along with minor studies of the potential for oil and natural gas throughout the province.

PEAT The field work in the peatland survey was completed which covered some 140,000 hectares of peatlands throughout the entire province. The maps are being finalized and computer programs developed to handle the entire 20,000 plus data points. There was a continuous request for peatlands for development purposes by the private sector.

OIL SHALES The oil shale policy was developed and areas put up for bid on a work bonus basis. There were 29 requests for the tender document and 2 bids received. Petrocan was the highest bidder on Block #1 and was awarded the Licence to Search.

Further field work was carried out on oil shale by Ball and Macauley who examined, sampled and petrochemically and chemically analysed samples from all existing cores. R.P.C., under contract to the Department of Natural Resources, carried out fluidized bed combustion work on oil shales and coal-oil shale mixtures.

PIPELINE AND UNDERGROUND STORAGE Numerous committees worked on both aspects with regard to the TQM pipeline proposal.

PUBLICATIONS The following publications were released in 1981:

GILDERS, R. D. and SALTER, R. F. 1981. Fluidized bed combustion of New Brunswick high sulfur coal and oil shales. Min. Res. Div., Dept. Nat. Res., Open File Report 82-9.

RESEARCH AND PRODUCTIVITY COUNCIL. 1981. Design concepts and preliminary economics for coal/oil shale combustion retort systems. Min. Res. Div., Dept. Nat. Res., Open File Report 82-28.

MACAULEY, G. and BALL, D. 1981. Oil shales of the Albert Formation, New Brunswick. Min. Res. Div., Dept. Nat. Res., Open File Report 82-12.

Industrial Minerals

The Industrial Minerals staff consists of Donald E. Barnett, industrial minerals geologist; Tim C. Webb, geologist; and Paul O'Leary, engineering technician. In addition, several other persons were employed during the year in term positions funded under the Minerals and Fuels Subagreement between the Province and the Canada Department of Regional Economic Expansion. These included Jacques Thibault, geologist; Allen Seaman, geologist; Ralph Simpson, engineering technician; Satish Chandra, engineering technician and Gretchen Gilbert, clerk-typist. Five summer students were also employed for the duration of the field season.

AGGREGATE RESOURCE MAPPING The program of granular aggregate resource mapping and evaluation was continued in 1981. Mapping was carried out in and around the areas of St. Stephen, McAdam, Plaster Rock, Juniper, Newcastle, Doaktown and Canterbury on N.T.S. map-sheets (1:50,000 scale) 21 O/3, 21 J/14, 21 J/15, 21 J/11, 21 J/10, 21 J/6, 21 J/7, 21 J/16, 21 J/9, 21 I/13, 21 G/13, 21 G/14, 21 G/3, 21 G/6, 21 G/11 and 21 G/12 (Figure 19). This work was carried out by in-house geological staff as well as under contract to Geocon (1975) Ltd. of Fredericton, New Brunswick.

QUATERNARY GEOLOGY The program of mapping the surficial geology of central and southeastern New Brunswick at 1:250,000 scale on N.T.S. map-sheets 21 H, 21 I and 21 J was completed in 1981 and the results published in Map Reports 81-1, 81-2 and 81-3.

A study of the quaternary geology of New Brunswick was commenced in 1981 and is scheduled for completion by early 1983. Funding for the first year's work is under the Minerals and Fuels Subagreement, with the Geological Survey of Canada funding the second year. The study involves the compilation of all published surficial geological data as well as field studies to "marry" the various authors' geological units. The results will be published in report form together with a map at a scale of 1:500,000.

GRAVITY Collection of additional gravity data was continued in 1981 with gravity readings taken in the Moncton and Central Carboniferous Subbasins. Additional data points were spaced so as to provide a regional picture as well as, in some cases, to provide more detailed information for gravity modelling studies. A gravity model was prepared for the Dorchester area of the Cumberland Subbasin, and several others (Smithtown, Salina, Salt Springs, Millstream, Plumweseep, Penobsquis, Five Points, Anagance, Portage Vale and Upper Point de Bute anomalies) were in progress by the year's end.

A report covering all gravity work since 1977 was commenced in 1981 and is scheduled for completion in 1982. The work under the senior authorship of Jim Chandra, geophysicist, will include a compilation of all gravity data at a 1:50,000 scale and a computer printout of all Bouguer gravity values within the Province.

MANAGEMENT The management of aggregates on Crown lands continued in 1981 under the Quarriable Substances Act.

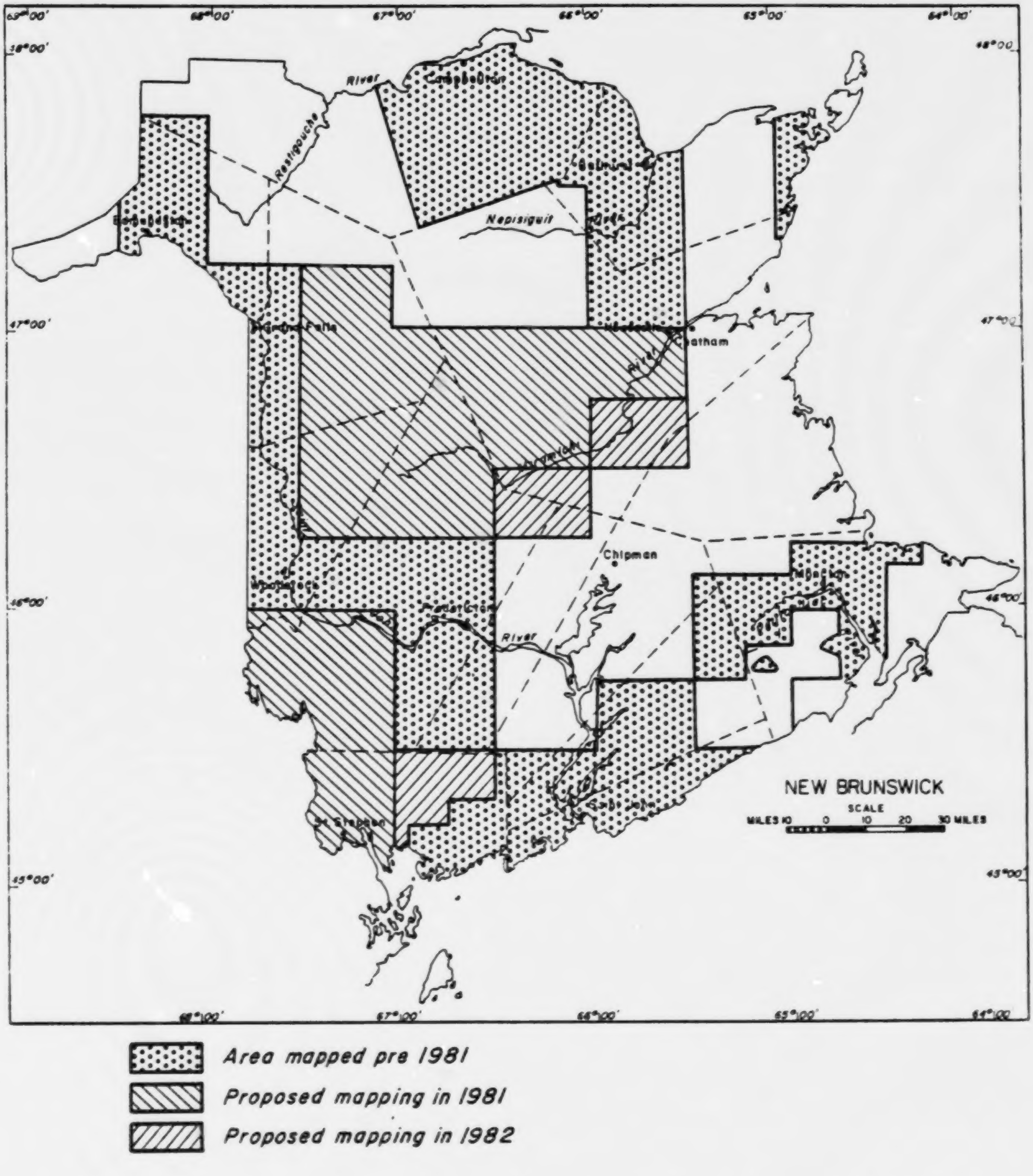

69°00'
68°00'
67°00'
66°00'
65°00'
64°00'
48°00'
47°00'
46°00'
45°00'
River
Restigouche
Campbellton
Bathurst
Nepisiguit
Edmundston
Grand Falls
Newcastle
Chatham
River
Miramichi
Chipman
Woodstock
Fredericton
River
Moncton
Saint John
St. Stephen
NEW BRUNSWICK
SCALE
MILES 10 0 10 20 30 MILES
Area mapped pre 1981
Proposed mapping in 1981
Proposed mapping in 1982

Figure 19. Granular Resource Mapping in New Brunswick, 1981

A total of 258 quarry permits were issued during the year. This represents an increase of 9 per cent over the previous year. Quarry leases to Brunswick Ready Mix Concrete Ltd., Brunswick Mining and Smelting Corporation Ltd., Dundee Cement Products Ltd. and Acadian Granite Ltd. were also in effect in 1981. Inspections were made throughout the year to ensure that regulations under the quarry permit or lease were complied with. A total of 1.39 million metric tonnes of sand and gravel were removed from Crown land in 1981 with a royalty value of $139,000.

A representative continued to sit on the Land Management Advisory Committee to provide information for the orderly development and management of Crown lands. Numerous reports on the aggregate potential of lands involved in Crown land exchanges were prepared throughout the year.

Liaison with industrial mineral producers continued in 1980. Bids were called for a fourth potential potash reservation area in the region of Dorchester, but drew only limited response. By the year's end the province had decided not to accept any bids for the potash exploration rights at Dorchester.

PUBLICATIONS The following publications were released in 1981:

FINAMORE, P. F. 1981. Granular aggregate resources of the Woodstock and Millville map-areas, New Brunswick (N.T.S. 21 J/4 and 21 J/3). Min. Res. Div., N. B. Dept. Nat. Res., Open File Report 81-4.

COOPER, A. J. 1981. Granular aggregate resources, Andover (N.T.S. 21 J/12) and Florenceville (N.T.S. 21 J/5). Min. Res. Div., N. B. Dept. Nat. Res., Open File Report 81-2.

THIBAULT, J. 1981. Granular aggregate resources of Fredericton Junction (N.T.S. 21 G/10) New Brunswick. Min. Res. Div., N. B. Dept. Nat. Res., Open File Report 81-5.

SEAMAN, A. A. and THIBAULT, J. 1981. Granular aggregate resources of Fredericton (N.T.S. 21 G/15), New Brunswick. Min. Res. Div., N. B. Dept. Nat. Res., Open File Report 81-27.

SEAMAN, A. A. 1981. Granular aggregate resources, Burtts Corner (N.T.S. 21 J/2), New Brunswick. Min. Res. Div., N. B. Dept. Nat. Res., Open File Report 81-28.

RAMPTON, V. N. and PARADIS, S. 1981. Quaternary geology of Woodstock map-area (21 J), New Brunswick. Min. Res. Div., N. B. Dept. Nat. Res., Map Report 81-1.

RAMPTON, V. N. and PARADIS, S. 1981. Quaternary geology of Moncton map-area (21 I), New Brunswick. Min. Res. Div., N. B. Dept. Nat. Res., Map Report 81-2.

RAMPTON, V. N. and PARADIS, S. 1981. Quaternary geology of Amherst map-area (21 H), New Brunswick. Min. Res. Div., N. B. Dept. Nat. Res., Map Report 81-3.

MINES COMMISSIONER'S ADJUDICATIONS

The majority of the Mines Commissioner's cases for the year 1981 involved damage to private property as a result of mining operations, although in all cases the property damage sustained was minimal. Our chief concern lies in the fact that the public generally does not understand mining law. That is to say that minerals belong to the Crown (the people) and rights to the same are allocated by the Crown pursuant to the Mining Act. This is of prime concern to owners of private land since these owners consider allocation of mineral rights covering their properties as an infringement on their rights. Because mining in New Brunswick has become active in relatively recent years, it becomes difficult for the land owner to realize that his grant is for surface rights only and does not include rights to minerals. These rights in the vast majority of cases have been exempted from the grant and reserved to the Crown.

Considerable time in 1981 was devoted to revisions to the new Mining Act, and during the year the Mines Commissioner was involved in the following cases:

1. Dunbar vs. Hitchcock (damages due to a mining operation)
2. Steeves vs. Keddy, Vacon and Mayer (staking damage to private property)
3. Silverjack Mines Ltd. vs. Ralph Furlotte (entry upon private land)
4. Morton Gordon (extension of time)
5. Tucker vs. U. S. Borax and Lithochem Expl. Ltd. (road damage)
6. Hallett vs. Billiton (property damage)
7. Knorr vs. Billiton (property damage)

CHAPTER 3. METALLIC MINERALS

In 1981 metallic production was recorded from three producers: Brunswick Mining and Smelting Corporation Limited, Heath Steele Mines Limited and Consolidated Durham Mines and Resources Limited.

Base metal production increased over the previous year but decreased prices for silver, lead and copper resulted in lower returns to the mine operators. (Table 11)

PRODUCING MINES

BRUNSWICK MINING AND SMELTING CORPORATION LIMITED

Brunswick operates two mines, No. 6 and No. 12, a concentrator and a lead smelter.

LOCATION The Brunswick No. 12 mine is located about 15 miles west of Bathurst in Gloucester County at Lat. 47°28.5'N and Long. 65° 53.5'N. The Brunswick No. 6 mine is located about 18 miles southwest of Bathurst and about 6 miles south of No. 12 mine at Lat. 47°24.3'N and Long. 65°49.5'W. The concentrator which treats ore from both mines is adjacent to No. 12 mine. The lead smelter is located at Belledune Point about 30 miles in a direct line from No. 12 mine.

HISTORY The presence of sulphides was noted in 1907. Rediscovery in 1952 by drilling of electromagnetic targets located the No. 6 mine. Investigation of other electromagnetic targets on strike pinpointed a target for drilling at the site of No. 12 mine in 1953. The property was granted to Brunswick Mining and Smelting which was controlled by St. Joseph's Lead Company. During the period 1953-57 an open pit and pilot mill were constructed at the No. 6 location. In 1961 interest transferred to M. J. Boylen, K. C. Irving and Patino Corporation. Development commenced at No. 12 in 1962 and the mine commenced production in 1964. Production was reached at No. 6 mine in 1966. In 1967, Noranda invested $50 million and gained control. A proposed $50 million expansion undertaken in 1974 was completed in 1981. During the years 1979 to 1981 nearly $69 million in capital expenditures were made at the mine and smelter.

COMPANY Brunswick Mining and Smelting Corporation Limited
Mining Division (P. O. Box 3000, Bathurst, N. B.)
Smelting Division (P. O. Box 2000, Bathurst, N. B.)
Mine Manager (J. W. Moerman)
Smelter Manager (A. Young)
President (W. James, P. O. Box 45, Commerce Court West, Toronto, Ontario)

EMPLOYEES The Mining Division has 1,733 employees.

PRODUCTION Total production during 1981 was 3,423,000 tonnes of ore as follows (see also Tables 11, 12, 13, 14, and 15):

No. 12 Mine - 3,401,000 tonnes containing 8.75% Zn, 0.35% Pb, 0.35% Cu and 98 g Ag/tonne
No. 6 Mine - 22,000 tonnes containing 7.38% Zn, 2.69% Pb, 0.14% Cu and 84 g Ag/tonne

Concentrates Produced

	tonnes	% Zn	% Pb	% Cu	g Ag/tonne
Zinc	407,600	51.6	----	----	89
Bulk	80,500	32.2	19.2	----	359
Lead	210,300	----	30.7	----	481
Copper	21,100	----	----	22.3	3,109
	719,500				

Recoveries

Zinc	70.3			
Bulk	8.6	12.9		8.7
Lead		53.7		30.2
Copper			39.4	19.6

Smelter Production

Pb (tonnes)	Ag (kg)	Acid (tonnes)
49,100	94,000	159,200

Ore Reserves and Grade

	Tonnes (000)	% Zn	% Pb	% Cu	g Ag/ tonne	Total Tonnes (000)	
						1981	1980
No. 12 Mine							
Proven	56,599	9.12	3.69	0.29	96		
Portable	44,026	9.08	3.78	0.36	98	100,625	99,535
No. 6 Mine							
Proven	288	6.73	2.37	0.33	74	288	380

DEVELOPMENTS FOR 1981 The most significant developments during the year were the completion of mining expansion to 10,000 tonnes per day and the decision to proceed with a 100,000 tonne per year zinc reduction plant.

OUTLOOK Continued efforts will be made to develop further mining areas in the No. 12 mine and exploration to assess downward extension of the orebody at No. 6 will take place.

HEATH STEELE MINES LIMITED

LOCATION The Heath Steele Mine is located 32 miles northeast of Newcastle in Northumberland County at Lat. 47°17'N and Long. 66°05'W.

HISTORY Discovered in 1954 by airborne E.M., mining began in 1957 but shut down between 1958 and 1962 because of low metal prices and poor recoveries. Reopened in 1962 with a contract to treat the Wedge ore in part of the concentrator. Production capacity was increased from 1,600 tons to 3,000 tons per day in 1970 and to 4,000 tons in 1977. New production shaft (No. 5) was completed to a depth of 2,915 feet in 1976.

COMPANY Heath Steele Mines Limited is owned by Noranda Mines (75%) and Asarco (25%). President is R. C. Ashenhurst. Mine Manager is Frank Grebenc.

PRODUCTION Capacity is reported to be 4,000 tons of ore per day.

Total production (or treated)	1980	1981
tons		
ore	1,380,000	1,390,000
concentrates	174,600	156,000
copper	6,300	7,800
lead	8,800	9,100
zinc	46,000	41,700
oz.		
silver	998,900	990,000

ORE RESERVES (1981 12 31) 30,200,000 tons at 1.46% Pb, 1.24% Cu and 1.76 oz. Ag/ton

DEVELOPMENTS FOR 1981 February 9 at 11:00 a.m. 200 tons of explosives were detonated underground; 603,000 tons of ore were broken - about 2 years production of broken ore

OUTLOOK The outlook is not quite as good as stated a few years ago. The overall situation is not clear, but the ore grade is lower than the Brunswick deposits, and Heath Steele's mining methods apparently are quite different.

LAKE GEORGE ANTIMONY

Consolidated Durham Mines and Resources

LOCATION - The Lake George antimony mine is situated about 9 miles north of Harvey Station, York County.

HISTORY - Antimony sulphide was first discovered on the property in 1863. There was minor production between 1880 and 1884. The first major development that led to production occurred in 1969-71.

COMPANY (Ex. Off. - Pres., Mine Mgr., Etc.) - F. D. Corman is president and Bertin Bourgoin is the mine manager.

PROPERTY AND DEVELOPMENT - Detailed drilling has been mainly concentrated around the present mine workings. An inclined shaft provides access to the ore zones.

EMPLOYEES - The company has reduced staff to key employees.

PRODUCTION - Please refer to company's annual report and Table 16.

DEVELOPMENTS, 1981 - The company continued a diamond drilling program during 1981 to extend ore reserves. The antimony zone, discovered northeast of the mine, contains 853,175 tons of ore grading 4.15% Sb using a 1.5% cut-off grade or 604,485 tons, grading 5.17% Sb using a 2% cut-off grade.

"During the course of this programme, tungsten/molybdenite/gold occurrences were encountered approximately one mile north of the present shaft, the significance of which will be investigated at a later date."

OUTLOOK - "The antimony ore body appears to be the downward extension of the present Hibbard vein, and the reserves referred to above occur between the 800 and 1,400 foot vertical horizons. This new ore can be reached by extending the present incline shaft. Although the Directors' decision to proceed with the development of this ore body has not yet been made pending a final feasibility study, it would appear likely that a favourable decision will be made.

All underground mining equipment has been retrieved, reconditioned and can be re-utilized. Revamping of the mill and modifications to the head frame and hoist are proceeding, as well as rehabilitation and modifications of the shaft track-bed. This work will probably take until March or April of 1982, and if a decision to proceed with the development of the new ore body is favourable, mining, on a stock pile basis, could proceed within 300 days from that date, with production at 400 tons per day within 375 working days from that date."

PROPERTIES IN DEVELOPMENT STAGE

CARIBOU DEPOSIT

Potential Zn-Pb-Cu-Ag Producer
Anaconda Canada Ltd., Cominco, Chaleur Bay Syndicate

LOCATION About 25 miles west of Bathurst in Restigouche County (47°34'N and Long. 66°17.6'W).

HISTORY Discovered in late 1955 by Anaconda Copper Mining Company through regional geological mapping using aeromagnetic maps and photo interpretation. Ground EM pinpointed drill target. Mining of secondary (near surface) copper took place between November, 1970 and November, 1971. Metallurgical problems caused shutdown. Production resumed September, 1973-September, 1974. Extractive metallurgy research on Pb, Zn, Cu ore continuing.

COMPANY Caribou-Chaleur Bay Mines Limited; Ex. Off., 260 8th Street, Toronto, Ontario M8V 3E1; Pres., R. L. Sinclair; Mine Mgr. and V.P., A. Buzas; Anaconda Canada Ltd. 67.5%, Cominco Limited 22.5%; Chaleur Bay Syndicate 10.0%; Caribou-Smith M.L. (east part of sulphide body) controlled by Anaconda Canada Ltd.

PROPERTY AND DEVELOPMENT Held under mining licence. Anaconda excavated an adit in late 1950's and in late 1960's and early 1970's incline was driven from adit; coincidentally a 1000 ton/day mill and copper concentrator was constructed.

PRODUCTION Secondary copper ore produced. (Table 17)

	tons(ore)	tons (concentrate)
Nov. 1970-Nov. 1971	147,829	21,691
Sept. 1973-Sept. 1974	213,000	29,536

FINANCIAL Caribou-Chaleur (3,000 million shares); Caribou-Smith (3,000 million shares).

RESERVES 49,400,000 tons grading 4.48% Zn, 1.7% Pb, 0.47% Cu and 1.71 oz/ton Ag (probably a smaller tonnage with higher grade (25,000,000 tons).

DEVELOPMENTS FOR 1981

1) Further proving up of their reserves down dip was accomplished by deep drilling in 1981.

2) Investigation of the mining method to be employed. The method under consideration is the so-called vertical crater retreat (VCR). This method is being used in a 50,000 ton test stope.

3) Improving the recovery of zinc and lead minerals from the extremely fine-grained pyritic, in part secondary enriched ore. The pilot plant testing is scheduled to end in early 1982.

4) To study the environmental aspects of their mine operation. This includes finding a suitable tailings disposal area, removing old structures for run-off control, and relocating and processing a stockpile of ore, gossan, and waste. Small amounts of gold and silver will be recovered before the material is graded and revegetated.

The decision regarding further plans is supposed to be made in mid-1982.

CHESTER MINE

Chester Mines Limited, Northumberland County, N. B.

LOCATION Approximately 45 miles west of Newcastle at Lat. 47°06'N, Long. 66°13.9'W.

HISTORY Discovered by Kennco Canada Exploration in 1955 and sold to Chesterville Mines Limited in early 1960's. Acquired by Sullivan Group in late 60's.

COMPANY Chester Mines Limited (100% owned by the Sullivan Mining Group Ltd.); Ex. Off. 2500, 500 Place d'Armes, Montreal, Quebec H2V 2W6; President, J. J. Beauchemin.

PROPERTY AND DEVELOPMENT Held under mining licence (5,379 acres) - 138,000 feet of diamond drilling carried out, a decline to over 1200 feet constructed in 1975. Water treatment plant begun in 1974.

RESERVES AND GRADE Open pit reserves (probable): 1.6 million tons grading 2.12% Zn, 0.83% Pb, and 0.63% Cu; 3.3 million tons grading 0.82% Cu. Underground reserves (probable): 3.8 million tons grading 1.58% Cu; 9.2 million tons grading 0.44% Cu.

OUTLOOK Deposit will be mined when copper prices improve.

PROBLEMS Mine water could be a problem. Clearwater Stream runs near the orebodies, drains to South Sevogle River. A site selection for a concentrator could present problems.

MOUNT PLEASANT TUNGSTEN DEPOSIT

Billiton Canada Ltd.
Charlotte County, New Brunswick

LOCATION The Mount Pleasant property is situated about 30 miles northeast of St. Stephen, Charlotte County.

HISTORY The first mineral showings and a geochemical anomaly were discovered in 1954. A tin-base metal orebody was discovered in 1962 and a large tungsten-molybdenum-bismuth orebody in 1969. The property is presently managed by Billiton Canada Ltd.

COMPANY (Ex. Off. - Pres., Mine Mgr., Etc.) J. W. Gilbey is president of Billiton Canada Ltd.

PROPERTY AND DEVELOPMENT The property has been extensively explored by diamond drilling (335,000 feet) and adits. A large decline is under construction in preparation for production, along with the construction of a mill.

EMPLOYEES Mining and construction crews are employed by contractors involved in underground work, mill and mine building construction.

PRODUCTION POSSIBILITIES Billiton Canada Ltd. plans to start production during the third quarter of 1982, when mill construction is expected to be completed.

FINANCIAL The Sullivan Mining Group has spent about $9 million, and the former owner, Mount Pleasant Mines Ltd., invested about $3 million in development of the property. It will cost probably in excess of $100 million to put the mine into production.

RESERVES AND GRADE The most recent reserves are as follows: 7 million tons grading .39% W, .22% Mo, .11% Bi; 19 million tons grading .2% W, .14% Mo and .08% Bi, and 2.6 million tons grading .42% Sn, .055% W, .05% Mo, .06% Bi.

DEVELOPMENTS FOR 1981 Underground work consisted of the sinking of a decline and driving of several drifts in preparation of production. Mill construction progressed on schedule.

OUTLOOK Geologic evidence indicates that the ore tonnage presently outlined by detailed drilling and underground workings probably will be significantly expanded. Plans call for production to start during the third quarter of 1982.

EXPLORATION HIGHLIGHTS IN 1981

BASE METALS

Brunswick Mining and Smelting Corporation acquired options on the Flat Landing Brook and Nine Mile Brook sulphide deposits from Sabina Industries, and the Canoe Landing Lake sulphide deposit from Clearwater Mines. Drilling in the Flat Landing Brook deposit began in mid-1981 and is continuing at the time of writing (December, 1981). The Company reported spending $2.9 million on exploration in New Brunswick during the year.

Drilling was also carried out on the Fronsac and Devils Elbow deposits, but the results are not encouraging in either case. Interesting vein-type Zn-Pb-Ag sulphides have been encountered by drilling northwest of the abandoned Keymet Mine in rocks of the Elmtree Group. Work on several other claim groups is summarized later in this report.

Billiton Canada Limited continued their work on the Half Mile Lake and Restigouche sulphide deposits. According to the Northern Miner, two intersections in a drill hole at the north end of the Restigouche deposit assayed as follows: 21.9 m (72 feet), 0.34% Cu, 6.19% Pb, 8.2% followed lower down by 17.2 m (56.5 feet), 0.35% Cu, 4.8% Pb, 6.9% Zn and 3.56 oz/ton Ag. It is not known how this hole changes the calculated tonnage - 2.6 million tons grading approximately 9% Zn, 5% Pb and 3 oz/ton Ag. Presumably Billiton have now earned their two-year operation on Placer Development's interest in the deposit.

Anaconda continued to assess their Caribou deposit. They have recently reported the results of 16 deep diamond drill holes that confirmed the down dip continuity of the sulphide body. In a press release in December, 1981, Anaconda reported that a 50,000 ton test stope is being mined using the Vertical Crater Retreat method which is thought to be the most efficient mining method for the Caribou deposit. Environmental work is complete and a final report on the pilot plant metallurgical testing is expected in February, 1982.

Esso Minerals actively explored their large claim group surrounding the Turgeon (Heron) massive sulphide deposit. The host rocks are submarine basaltic lavas and tuffs of the Fournier Group. Several drill holes have now penetrated the deposit which is the only one of its kind discovered to date in northern New Brunswick.

Placer Development drilled several holes in their Portage Lakes showing but the results were discouraging.

Amax drilled a number of holes in the Popelogan Cu-Mo skarn deposit but have not yet reported the results.

Canadian Occidental Petroleum explored several properties, some in granitic terrane, others in the flanking Devonian-Silurian volcanic sedimentary belt. They have a number of promising targets, but the best appears to be a base metal-uranium showing in Devonian granite near Long Lake. A summary of their work appears later (pp.76-77).

Key Anacon Mines carried out a drilling program (not reported) during the summer on their massive sulphide deposit. The results apparently have not improved the economics of the deposit.

Other exploration companies who filed assessment work in 1981 are as follows: Mattagami Lake Explorations Limited, Essex Minerals, South Bathurst Joint Venture, Metallgesellschaft Canada Limited, Millstream Mines Limited, Heath Steele Mines, Texasgulf Incorporated, Cominco Limited, Dungannon Explorations Limited, Dungarvon Resources Limited, and Gulf Minerals Canada Limited.

Newcomers to northern New Brunswick include BP Minerals Limited, Sherritt Gordon Mines Limited, Hudbay Mining Limited and Pancontinental Mining (Canada) Limited.

Other companies who hold claims in the region but who have not reported work in 1981 are as follows: Eldorado Nuclear Limited, Chester Mines Limited, Newmont Exploration Limited, McIntyre Mines Limited, Sabina Industries, Little Long Lac Mines Limited, Kennco Exploration Limited, Beresford Mines Limited, W. G. Wahl Limited, Silver Jack Mines Limited, Conwest Exploration Limited, Asarco Exploration Company Limited, Shell Canada Resources Limited, Preussag Canada Limited, Terra Nova Exploration Limited and Rio Tinto Explorations Limited.

POTASH

BP Explorations Company Ltd. discovered what appears to be a major potash deposit in the Millstream area, west of Sussex. This discovery, together with the P.C.A. deposit in Penobsquis and the Denison deposit in Salt Springs, will undoubtedly greatly enhance the impact of mining on the New Brunswick economy.

TIN-TUNGSTEN-MOLYBDENUM-ANTIMONY

Mill construction and underground development by Billiton Canada Ltd. at the Mount Pleasant tungsten-tin-molybdenum deposit is progressing on schedule and production is expected to start during the third quarter of 1982. In addition to mine development at Mount Pleasant, Billiton conducted a vigorous exploration program for tin, tungsten and molybdenum at Tower Hill and Pleasant Ridge west of Mount Pleasant, in the Niles Brook area north of Mount Pleasant and in the Square Lake area near Welsford. Although no discovery of orebodies was reported, highly anomalous amounts of tin (up to 450 ppm) were detected in drill core from greisenized granite at Pleasant Ridge. Billiton also conducted an I.P. survey and a limited diamond drilling program on the Shin Creek molybdenum-tungsten prospect, which the company optioned from Mr. H. C. McNamara. Although no orebody was delineated, silicified porphyry and breccia intersected in drill cores confirmed the presence of a subvolcanic complex and hydrothermal alteration effects similar to those found at Mount Pleasant. Exploration for a tungsten-molybdenum ore zone in this area will require an extensive deep drilling program.

MEX Exploration Ltd.* found a 3 m wide shear zone, containing tin minerals, base metal sulphides, hematite and magnetite that cuts across Silurian sedimentary rocks southeast of the Pleasant Ridge granite stock. In 1962 a similar occurrence was found at True Hill, 3 km west of Mount Pleasant, which is presently held by St. Joe Canada Inc.

Shell Canada Resources Ltd. conducted an extensive till sampling program and lithogeochemical survey in their Victoria-Mistake Lake Group in the St. George Batholith. A large low-grade tin-bearing zone was found, but more work is required to delineate an ore zone.

Consolidated Durham Mines and Resources Ltd. completed delineation of an antimony orebody northwest of the Lake George Mine workings. Mining of this newly discovered orebody will require deepening of the present shaft or sinking a new one. Below this newly discovered ore zone, an altered granite porphyry with a well-developed skarn zone was intersected. The porphyry and skarn contain numerous quartz-calcite diopside-hedenbergite, tremolite-actinolite and scheelite-bearing veins.

Several low-grade scheelite occurrences were found recently by Robert Connor and Ronald Morrison in the Coac Stream-Upper Caverhill area north of the Saint John River near Nackawic. These occurrences are associated with the youngest phase of the Devonian Pokiok Batholith.

URANIUM

Uranium exploration for vein-type deposits, similar to those found in the South Mountain Batholith of Nova Scotia, was conducted in parts of the St. George Batholith. The search for roll-front type deposits was continued in Carboniferous red beds of the Moncton and Cumberland Subbasins.

Uranerz Exploration and Mining Ltd. covered an extensive area in southwestern New Brunswick (780 line kilometers) with a helicopter-borne radiometric, magnetic and VLF-EM survey. The radiometric anomalies found by this survey will require ground verification. Detailed ground surveys were carried out by the company in the Mount Champlain Intrusion (near Johnson Croft), the South Oromocto Lake area and Wards Creek area (southwest of Sussex), but no deposits of economic interest were found.

Western Mines Ltd. continued work in the Trout Lake and Lily Lake areas in the St. George Batholith. In previous years, some highly anomalous amounts of uranium were detected in spring and stream sediment samples (up to 2960 ppm at Lily Lake and 5130 ppm at Trout Lake). A narrow altered (clay and hematite) band with above background radioactivity also was found in the Trout Lake area. However, no deposits of economic interest have been reported.

Gulf Minerals Canada Ltd. continued detailed work on their Lower Millstream uranium prospect, which occurs in the Carboniferous

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* This discovery has not been reported to date.

Albert Formation. A limited diamond drilling program (704 meters) did not detect any radioactive minerals of economic interest along strike from the original INCO uranium discovery in the area.

Brunswick Mining and Smelting Ltd. drilled eight holes in the Upper Carboniferous red beds of the Pictou Group, which underlies their Cape Spear claim group. Small amounts of radioactive minerals occur in reduced beds at the base of fining upwards cycles. One narrow reduced section assayed 190 ppm U, but no deposit of economic interest was found.

Cominco Ltd. drilled four holes in Pennsylvanian red beds that occupy their claim group in the Rusagonis area, 15 km south-southeast of Fredericton, but no radioactive minerals were detected.

BASE METAL

Campbell Resources Inc. conducted Maxmin HELM and magnetic surveys in the Goose Creek, Upper Goose Creek, Quiddy River and "Old Lumsden Mine" areas in the Upper Precambrian volcanic and sedimentary rocks of the Caledonia Highlands. There is potential for stratiform base metal sulphide deposits in these areas. The most significant result from these surveys is the discovery of a geophysical anomaly on strike with a known sulphide occurrence in the Upper Goose Creek area. Drilling of this anomaly was recommended. The company also investigated a claim group in the "Old Vernon Mine Area" along the Bay of Fundy coast for copper deposits in quartz-carbonate veins. It was estimated that this property could contain 1-3 million tons of ore grading 2-3 per cent copper and 0.001-0.25 gold/ton.

Lithochem Explorations Ltd. delineated two hydrothermally altered zones in the Silurian volcanic rocks of the western Mascarene Peninsula south of St. George. These anomalies are characterized by distinct Na_2O depletion and MgO enrichment. Base metal sulphide occurrences outcrop in the vicinity of these anomalies.

Brunswick Mining and Smelting Ltd. mapped the geology and conducted a soil sampling program on a claim group that covers several base metal sulphide occurrences in shear zones that cut across Silurian or younger granitoids and Precambrian carbonates in the Quispamsis area. The company mapped the geology of the property and conducted a soil sampling program. Anomalous amounts of Cu, Pb and Zn were found over a widespread area.

GOLD

Gordex Exploration Ltd., a small private company, conducted an extensive exploration program for gold in the Cape Spencer area. Varying amounts of gold and pyrite occur in easterly striking quartz ± carbonate veins that cut across volcanic and sedimentary rocks of the Carboniferous Mispeck Group.

Although there have been numerous inquiries about gold occurrences during 1981, it appears that no major exploration companies have initiated an extensive gold exploration program.

EXPLORATION ACTIVITY IN NORTHERN NEW BRUNSWICK

GENERAL

Activity in mineral exploration in northern New Brunswick remained at the 1980 level. Exploration expenditures reported as assessment work (to December 23, 1981) totalled $2.9 million ($1.07 million in 1980). A third of this amount is the cost of a drilling program in the Caribou Deposit by Anaconda. Again a substantial amount of the work was carried out by Brunswick Mining and Smelting Corporation (aided by Noranda Exploration) who holds several thousand claims in the region.

A release of the results of a silt survey in the Bathurst-Newcastle area early in 1981 by the Mineral Resources Division began a minor staking rush in four or five areas. Follow-up work, however, has not yet been filed.

Assessment reports received by the New Brunswick Mineral Resources Division are summarized on the following pages.

ZONE 1 - EDMUNDSTON, AROOSTOOK-MATAPEDIA AND CHALEUR-TOBIQUE ZONES

(16) Canadian Occidental Petroleum Limited

(a) Shin Group 21 O/3E

This property is underlain by northerly trending Devonian sediments and felsic and mafic volcanic rocks. The initial interest stemmed from a New Brunswick Mineral Resources stream sediment anomaly (Zn-Pb-Cu). Detailed soil sampling outlined a prominent NW-SE trending Cu-Pb-Zn-Ag anomaly. Two drill holes (SG-6 and SG-7) put down by Amoco in 1976 did not encounter significant mineralization. Trenching and induced polarization and VLF-EM surveys are recommended.

(b) Shep Group 21 O/3E

The Shep claims are underlain by poorly exposed Devonian siltstone and sandstone. A uranium-copper stream silt anomaly discovered in an earlier campaign (1971) led to speculation regarding a possible uranium "roll-front" target.

Work reported comprises a geological survey and stream silt and rock geochemical sampling. Several stream silt and water samples have anomalous U content, however, rock samples are low in U. A detailed geochemical survey is recommended to pinpoint the uranium source.

(c) Evy Group 21 O/3E

This group was originally staked in 1971 because of anomalous uranium, copper, zinc, silver and molybdenum in stream sediments. It was restaked in 1979 following a geochemical data release by the New Brunswick Geological Surveys Branch.

In 1979, follow-up silt, water, soil and rock geochemical and scintillometer surveys were carried out. The 1980 program comprised geological, geochemical (soil and rock) and scintillometer surveys.

The claims are underlain by northeasterly trending open folds involving poorly exposed Devonian sediments and felsic volcanic rocks and minor basalt and gabbro. The geochemical surveys indicated several areas with anomalous Cu (35 ppm), Pb (100 ppm), Zn (200 ppm), Ag (1.7 ppm) and U (7.5 ppm).

The scintillometer survey reveals a prominent north-south trend with some of the anomalies corresponding to uranium highs in soils. Occurrences of zinc and lead sulphides were observed in angular float, and it appears that most of the base metal anomalies may be related to fracturing and faults particularly at sediment-felsic volcanic contacts.

(c) Left Group 21 O/3E

This group was staked in 1979 to cover stream silt anomalies outlined by the New Brunswick Geological Surveys Branch that confirmed 1971 results obtained by Canadian Occidental.

Work to date consists of geological soil and rock geochemical and scintillometer surveys.

The Left Group is underlain by Devonian flow-banded and brecciated felsic volcanic (minor vesicular basalt) and sedimentary rocks intruded by a quartz-diorite stock and diabase dykes. A small Cu-Pb-Zn soil anomaly in the southwest part of the group is correlative with occurrences of chalcopyrite, galena and pyrite. No significant scintillometer anomalies were found.

(f) Stew Group 21 O/3E

This group adjoins the Evy Group, and was staked at the same time and for the same reasons. The work completed comprises geological, soil chemical and scintillometer surveys.

The area is underlain by Devonian volcanic and sedimentary rocks. Minor sulphides, mainly sphalerite, galena and chalcopyrite have been noted as fracture-fillings near sediment-volcanic contacts. Geochemical anomalies appear to be related to these sulphide concentrations. More detailed soil geochemistry, trenching and VLF-EM and induced potential surveys are recommended.

(g) Blue Group 21 O/3E

Initial interest in this area in 1971 arose from uranium (up to 184 ppm), zinc (up to 1020 ppm) and silver (up to 1.2 ppm) anomalies in stream silt in Four Mile and Blue Mountain Brooks. A follow-up survey confirmed the earlier work and added a lead anomaly (325 ppm).

In 1980 work comprised geological mapping, soil geochemical and scintillometer surveys.

The claims are underlain by a dominant northerly trending folded series of felsic volcanics generally reddish to purplish and in places vesicular and flow banded. Mafic volcanics seem to overlie the felsic phases. Several areas with various anomalous combinations of Pb-Zn-Ag-U were outlined and are thought to be due to fracture-filling sulphide mineralization.

(k) Black Group 21 O/3E

Interest in this area arose from anomalous Zn, Pb, Cu and Mo in stream sediments collected in 1971. Later silt sampling (1979) by the New Brunswick Geological Surveys Branch confirmed the anomaly.

The claims are underlain by Devonian flow-banded and brecciated rhyolite and green to grey siltstone. The rocks appear to lie in open northeasterly trending folds.

The work reported in 1980 comprises rock and soil geochemical and scintillometer surveys. Several soil metal anomalies were outlined, however only one (Zn-Pb-Cu-Ag-Mo-U) appears significant. The anomaly trends northeast and overlies rhyolite containing limonitic zones with disseminated chalcopyrite and galena. Two other anomalies are worthy of detailed study. Uranium potential appears to be low.

(17) Mattagami Lake Explorations Limited

(e) Tobique Project 21 O/3E

Results of three diamond drill holes, TM 80-5, 80-8 and 80-10 are reported. The holes were put down presumably to test electromagnetic and induced polarization anomalies. The holes cut Devonian siltstones overlying rhyolite and rhyolitic tuff. Minor sulphide concentrations occur at the contact, however base metal content is low.

(20) Essex Minerals

Nicholas Denys (Stephens Brook) Area 21 P/12W

Since 1978, Essex has carried out detailed geological and geochemical soil and stream silt and induced polarization surveys on these claims. The work carried out in 1981 comprises a vertical drill hole put down 404 m (1327 feet) to test a Mo soil anomaly. The area is underlain by a Devonian granitic stock (Nicholas Denys stock) that intrudes folded Silurian sediments.

The hole penetrated fresh and altered biotite-hornblende granite, cut by dykes of biotite porphyry, diabase and pink granite.

Molybdenite occurred as films in fractures, disseminations and in quartz veins. Minor pyrite, chalcopyrite and calcite were also noted. Enough Mo was present to explain the soil anomaly.

ZONE 2 - ELMTREE SUBZONE

(8) C. A. Willett

(a) Belledune Area 21 P/13W

These two groups, optioned by Esso Minerals Canada in 1980, are underlain by basalts, basaltic tuff, and minor felsic volcanic rocks (Fournier Group) which are overlain by Silurian sedimentary rocks.

The work reported comprises geological and magnetometer surveys. No significant mineralization was found.

(b) Muddy Lake Area

VLF-EM and magnetometer surveys were carried out on this property. Several conductors were outlined; the magnetic data, however, was featureless.

(9) Don Black

Heron Prospect 21 P/13W

This seven-claim property, optioned by Esso Minerals Canada, adjoins a large group of claims called the "Heron Prospect" by Esso Minerals. The sulphide deposit, the centrepiece of the Esso Minerals exploration effort, actually lies within Mining Licence 1155, optioned from Heron Mines Limited.

The area is underlain by basalt and metasediments of the Elmtree Group as well as Devonian? gabbros.

The work filed comprises a magnetometer survey that reflects basalt lithologies. A soil geochemical survey is mentioned, but the results are not described.

(10) Esso Resources Canada Limited

(a) Belledune River Area 21 P/13W

This property, comprising 26 claims, adjoins Don Black's seven claims reported above.

A geological survey indicates the area is underlain by sediments and minor volcanics of the Elmtree Group intruded by Devonian granite. The initial interest seems to have stemmed from an airborne EM conductor and a geochemical survey that indicated a Pb-Zn anomaly in the soil.

(b) Heron (Turgeon) Prospect 21 P/13W

This area was covered by a Sander Geophysics helicopter-borne electromagnetic-magnetic survey.

The area can be divided into two parts based on magnetic susceptibility: (a) an inactive zone underlain by Devonian sedimentary and volcanic rocks, and (b) a zone underlain by lower Ordovician Fournier Group mafic volcanic and plutonic rocks characterized by strong magnetic anomalies.

The EM data is complicated by man-made features such as electric power lines, railroads, etc. Several anomalies, thought to have their source in bedrock, are outlined and follow-up is recommended. It is notable, however, that the Heron (Turgeon) massive sulphide prospect is not indicated by an EM anomaly, perhaps because it lies beneath one of the electric power lines.

ZONE 3 - MIRAMICHI ZONE

(1) Brunswick Mining and Smelting Corporation Limited

(a) Project 203 21 P/5E

Work reported on this 500 claim block comprises the logs of two diamond drill holes and the results of a gravity survey. The work was carried out in late 1980. The drill holes were put down to test the flanks of a prominent gravity anomaly. Drill holes 203-7 encountered intercalated felsic, and mafic volcanic and sedimentary rocks under 42 m (137 feet) of Carboniferous rocks. Mafic rocks are thought to be the source of the gravity anomaly. A massive pyrite layer 0.6 m (2 feet) wide was intersected in graphitic schist at 256 m (840 feet).

Drill hole 203-8 cut 33 m (108 feet) of Carboniferous strata before encountering Ordovician gabbro, basalt, graphitic sediment and felsic tuffs.

(b) Project 440 (140), Clearwater Group 21 O/1

This large group (1055 claims) was staked in 1980 to cover stream sediment Cu-Pb-Zn-Ag anomalies and airborne EM conductors judged to be in favourable geological situations.

The initial work consisted of a reconnaissance geological survey, prospecting and silt sampling.

The property is underlain by strongly deformed mafic and felsic volcanic rocks and argillaceous and arenaceous sediments. Supracrustal rocks are intruded by Devonian granite in the western part of the property.

Three phases of folding are recognized. The dominant structure is a gently plunging F_3 fold. The silt geochemical survey unveiled several areas worthy of detailed follow-up.

Horizontal loop EM and magnetometer surveys carried out in 1981 outlined several anomalies. Many of these have been tested by drill holes in the past, however three conductive zones warrant further attention. One of these is a southward extension of the Bellechase sulphide showing known since the 1950's, the second is a possible graphitic zone drilled by Serem, and the third is in an area drilled by Shell Minerals. Diamond drilling is planned in these areas.

(c) Project 440 (160), Parks Brook 21 J/16

The 1980 program consisted of linecutting, geological, soil geochemical, horizontal loop EM (Max-Min) and magnetometer surveys. The property, made up of 151 claims adjoining the Camp Brook and Tomahawk properties, was staked to cover airborne EM anomalies previously outlined by Shell Minerals and Parks Brook Mines.

The property is underlain by poorly exposed, highly deformed Tetagouche Group felsic and mafic volcanic rocks that are in fault contact with less deformed Silurian sediments.

Several coincident weak EM and magnetic anomalies were outlined. Geochemical anomalies, however, are very weak.

(d) Project 440 (154), Tomahawk Group 21 J/16

Work reported in early 1981 over this 20 claim group consisted of a horizontal loop EM (Max-Min) survey. The initial interest stemmed from an airborne EM anomaly outlined by Shell Minerals in 1975.

Several very weak conductors were found.

(e) Project 440 (155), Burnt Hill Brook 21 J/10W

Work on this property, reported by K.D.A. Whaley, comprises prospecting, soil and silt sampling. Samples were analyzed for Cu, Pb, Zn, Mo, W and Sn. Known anomalies on Conroy Brook were reaffirmed but no new anomalies were found. The land owners hampered the work by restricting travel. Consequently a helicopter was used for access at three times the normal cost of the survey.

(f) Project 440 (152), Malcolm Brook 21 J/16W

Linecutting, geological, magnetometer, induced polarization, horizontal EM (Max-Min) and gravity surveys were carried out during 1980. The feature of interest is disseminated Cu-Pb-Zn sulphides that occur at a contact between felsic tuffs, metasediments and gneissic granite. Previous drilling by Rio Tinto and Texasgulf did not entirely explain geochemical soil and IP anomalies.

The results of the 1980 surveys were disappointing. Weak EM anomalies were outlined over previously drilled areas, but no new anomalies were discovered.

(g) Little River South Property (208) 21 P/4W

This property was staked in 1980 to cover an airborne EM anomaly outlined in 1979.

Max-Min II, soil geochemical, magnetometer and geological surveys were carried out over the 48 claims.

The claim group is underlain by interlayered basaltic and rhyolitic volcanics, including quartz feldspar porphyry and crystal tuff, and greywacke, graphitic, chloritic, slaty sediment. The dominant structure appears to be a southeasterly plunging isocline.

Several EM anomalies were outlined but all are thought to be due to graphitic sediments. Four of these anomalies were drilled previously by other exploration companies.

(h) Project 440 (147), Mount Fronsac 21 O/8W

This property covers an occurrence of massive Zn-Pb sulphides found in 1957 by Texasgulf. The best section in 18 drill holes was 11.4 m (37.4 feet) grading 1.7% Pb + Zn. Since 1957 the occurrence has aroused the interest of several companies and 16 more drill holes had been put down in the area before Brunswick Mining and Smelting acquired the property in 1980.

Work reported in 1980 comprises linecutting, gravity, induced polarization surveys and four drill holes (908 m, 2981 feet). The drilling indicates two or three northerly trending very low grade Pb-Zn zones hosted by chloritic sedimentary and felsic tuffaceous rocks.

(i) Project 440 (153), McGraw Brook 21 J/16W

This property, comprising 27 claims, is underlain by westerly trending Silurian sedimentary rocks.

The work reported consists of a geological, horizontal loop EM (Max-Min II) and magnetometer surveys.

A strong west-trending, steeply dipping conductor outlined for over 2400 m (8000 feet) is thought due to graphitic sediments.

(j) Project 207, Smoker Brook 21 P/4W

This group was staked in 1980 to cover airborne Input magnetic anomalies discovered in 1977 and 1979. Magnetometer, gravity and horizontal loop (Max-Min II) surveys were carried out.

The property straddles the edge of the Carboniferous cover. The magnetometer survey indicated two weak linear trends, and a broad weak anomaly which corresponds to an airborne anomaly. The gravity results showed two parallel positive anomalies over 1800 m (6000 feet) long which coincide with the magnetic anomalies. The HEM survey outlined weak conductors, some of which correlated with Input anomalies. The strong Input targets, however, had no ground EM response, suggesting the Input anomalies may originate in the Carboniferous rocks.

(k) Project 440 (157), Slate Island Brook 21 J/10W

Work reported on this 44-claim group comprises soil, silt and rock sampling and prospecting.

Prospecting outlined a cherty slate containing pyrite and arsenopyrite which underlies the site of an airborne magnetic anomaly. Follow-up soil sampling indicated three (Cu, Zn-Cu-Mo and Sn-Cu-Pb) anomalies. VLF and EM magnetometer and detailed soil surveys are recommended.

(l) Project 440 (159), East Elbow Project 21 O/8W

This property covers the extension of the "favourable horizon" that hosts the Devils Elbow Cu sulphide deposit to the west. The geology comprises interlayered felsic chloritic and sericitic tuffs, including quartz feldspar porphyry and crystal tuff.

The work reported consists of a geological compilation, and magnetometer, horizontal loop EM (Max-Min II) and gravity surveys. The magnetic and electromagnetic responses are generally poor. The gravity results outline a broad anomaly parallel to the geological trend.

(m) Project 440 (146), Devils Elbow 21 O/8W

This claim group (97 claims) is centered on the Devils Elbow sulphide deposit found by American Metals (Amax) in 1956-57 who outlined 550,000 tons grading about 1 per cent Cu. Since then, investigations by Cominco, Hanna Mining Company (Devils Elbow Mines) and Conwest Exploration Company have not appreciably altered the initial picture. Brunswick Mining and Smelting optioned the property from Conwest in 1980, and have carried out gravity Max-Min II, magnetometer and geochemical surveys. Five drill holes (1283 m, 4211 feet) were put down to test interesting targets.

The geology is dominated by a variety of felsic, chloritic and sericitic schistose tuffs, displaying up to three cleavages.

The drill holes encountered only weak sulphide concentrations presumed to be the down dip extension of the main sulphide zones.

(n) Project 440 (144), Millstream Group 21 O/9E, P/12W

This property, consisting of 102 claims, straddles the boundary between highly deformed Ordovician (Tetagouche Group) and mildly deformed Silurian rocks. Part of this boundary is represented by the Rocky Brook-Millstream fault system.

Work carried out consists of geological, Max-Min II magnetometer and soil geochemical surveys.

The Ordovician rock comprises basalt, basaltic tuff, gabbro and diabase with intercalated phyllites and graphitic schist and minor felsic tuff. The Silurian rocks consist of interlayered calcareous siltstone, greywacke and conglomerate.

The EM results indicated four conductors judged worthy of further investigation.

(o) Project 440 (150), Ahearn Extension 21 0/8E

The Ahearn Brook area is underlain by northerly trending Ordovician felsic and mafic volcanic and sedimentary rocks. The Brunswick Mining and Smelting property comprises 192 claims and 12 claims optioned from Wilfred Hachey.

Interest in the area stems from a small high-grade Pb-Zn-Ag deposit found here in 1970 by Findathoran Syndicate, as well as geochemical and airborne geophysical anomalies.

The 1980 Brunswick Mining and Smelting work comprises Max-Min II and magnetometer surveys. Although several weak conductors were outlined, only one appears to be interesting.

(p) Project 440 (156), McLean Brook 21 J/10W

This 56-claim group lies northeast of the Slate Island Group (k), page 70). The area is underlain by Cambro-Ordovician sediments intruded by Devonian granite.

The work reported comprises silt, soil and rock sampling, and magnetometer and EM 16 surveys. Geochemical samples were analyzed for Cu, Pb, Zn, Mo, W and Sn. Although no base metal concentrations were indicated, some anomalous Mo was revealed in silts and soils. EM results indicate strong northwesterly fractures and are related to geochemical anomalies.

(q) Project 440 (161), Long Pond Group 21 J/10E

This group of six claims was originally staked to cover a Mo-Pb-W stream silt anomaly outlined by the New Brunswick Geological Surveys Branch (Plate 80-6).

Work reported consists of geological mapping, prospecting and soil and silt sampling.

The bedrock consists of northeasterly trending Cambro-Ordovician quartzites and slates within a thermal aureole flanking Devonian granite.

Anomalous Cu, Pb, Zn or Ag was not found in the soils although two silt samples were high in Pb. Detailed and more extensive soil VLF-EM and magnetometer surveys are recommended.

(r) Indian Lake Property 21 0/8

In 1981, geological, magnetometer, Max-Min, EM, gravity and soil geochemical surveys were carried out on this 124-claim group. The original staking (1979-80) was based on an Input anomaly outlined in a 1977 airborne survey.

The EM survey outlined a conductor and a coincident gravity which corresponds to the Input anomaly. Soil analyses, however, revealed no decidedly anomalous Cu, Pb or Zn.

The property is underlain by poorly exposed quartz-feldspar porphyry, felsic and mafic tuffs and sediments.

(2) Anaconda Canada Explorations Limited

Caribou Project M. L. 798A, 798B 21 0/9W

Work reported comprises the logs and assays of 10 drill holes put down with M. L. 798A and 6 with M. L. 798B (total of 8376 m or 27,480 feet).

These deep holes were drilled to test the down dip continuity of the Caribou ore zone. On M. L. 798A, 8 of the 10 holes intersected sulphides; other holes had to be abandoned.

(3) Delbert Johnson

Parks Brook 21 J/10E

The property is underlain by dark grey slate and interbedded quartzites (Tetagouche Group) with a minor band of felsic volcanics. Interest in the area was aroused by a 700 ppm Zn anomaly in soil. SP and magnetic profiles proved negative; however, a VLF-EM survey indicated a strong conductor is present.

(4) South Bathurst Joint Venture

Long Pond Property 21 0/CE

Work reported on these 84 claims comprises soil and rock geochemical surveys. Nineteen trenches were bulldozed in the area to provide soil profiles to bedrock since previous work had indicated significant Pb-Zn-Cu soil anomalies.

Glacial deposits in the trenches were interpreted as lodgement, ablation and melt out tills.

The previous Pb-Zn-Cu soil anomalies were confirmed.

(5) Millstream Mines Limited

M. L. 1212   21 P/12W

This property covers a number of Pb-Zn-Ag sulphide vein showings known as the Quebec Sturgeon River deposit. They occur in a fault zone (in part unconformity) separating highly deformed Ordovician argillaceous sediments and arenaceous Silurian sediments. Two of the large vein concentrations have been investigated by underground workings.

The work reported in 1981 comprises a soil geochemical survey that indicates several Pb and Zn soil anomalies over 800 m of strike length.

(6) Norman Pitre

(a) Wedge West Group   21 O/8E

A long but narrow sulphide-rich zone was found in this area in 1962.

The property is underlain by easterly trending argillaceous and graphitic sediments and tuffs sandwiched between crystal tuffs and rhyolite. The sulphide concentration occurs at the northerly sediment-volcanic contact.

The work reported for 1980 consists of a Max-Min II horizontal loop EM survey over 18.5 km (11.5 miles). Several weak anomalies were outlined.

(b) Belledune area   21 P/13W

Magnetometer VLF-EM were carried out on this property in 1980. The magnetic data appears to outline a major contact, and several strong cross-overs were located with the VLF-EM unit.

The property is underlain by Fournier Group basalts, basaltic tuffs, gabbro and metasediment similar to the host rocks of the Turgeon (Heron) Cu-Zn sulphide deposit.

(7) Metallgesellschaft Canada Limited

Upsalquitch Group   21 O/8W

Work on this 46-claim group consisted of geological, magnetometer, VLF-EM, horizontal loop EM, self-potential and geochemical surveys.

The area is underlain by highly deformed quartz-feldspar porphyry and crystal tuff, metarhyolite tuff and metasediments.

Trenching proved that several conductors outlined by various electrical methods are due to graphitic sediments.

(11) Texasgulf Incorporated

(a) Rocky Brook North 21 J/10E

Magnetometer and VLF-EM surveys are reported on this property for 1980. The property is underlain by Cambro-Ordovician sediments intruded by Devonian granite.

Several easterly to northeasterly trending conductors are indicated but their significance is not discussed. The uncontoured magnetic results indicate no strong anomalies.

(b) Project 65, Rocky Brook 21 J/10E

The 1981 campaign consisted of line cutting, magnetic VLF-EM and gradient-induced polarization surveys. Soil samples collected in 1979 were re-analyzed for fluorine.

Several conductors are outlined on the grid cut mainly on the eastern part of the property. Most trend NNW or NW.

Anomalous fluorine in soils is evident in the south central part of the property near Rocky Brook. Contact of F generally ranges from 100 to 400 or 500 ppm, but several samples contain 1000 to 2000 ppm. The report does not discuss the significance of the electromagnetic or geochemical data.

(12) Cominco Limited

Stratmat M. L. 1007, 1008 21 O/8E

Work reported comprises 10 drill holes totalling 2126 m (6975 feet) carried out in early 1980. These holes were put down (a) to test coincident induced polarization, gravity and soil geochemical anomalies approximately 300 m (984 feet) north of what is known as the central zone and (b) to test the down dip extensions of the central sulphide zone (for a résumé of the so-called Stratmat sulphide deposits, see Open File Report 80-4, p. 77).

The results of (a) revealed the sulphide zone over 300 m (984 feet) along strike. The host rock consisted of intercalated chert and sericite schist about 9 m (29 feet) wide. This layer assayed 0.35% Cu, 0.62% Pb, 2.03% Zn and 0.25 oz/ton Ag.

Two of the three holes in the central zone returned the following results:

	Depth (m)	Width (m)	Cu %	Pb %	Zn %	Ag (oz/ton)
ST 117	170 m	3.0	0.19	1.41	2.97	0.71
ST 118	470 m	2.1	0.42	4.9	8.5	0.78

(13) Heath Steele Mines Limited

(a) East Boundary Extension 21 O/8E

This 21-claim group adjoins the east side of Mining Lease 238 (Heath Steele Mine). Work reported consists of magnetometer and Max-Min II EM surveys. The magnetic results show weak anomalies, and no significant EM conductors were outlined.

(b) Island Lake Claims 21 O/8E

Max-Min II EM and magnetometer surveys were conducted on this property in 1980. A drill hole (10-80) was put down, but there is no indication or explanation as to what the hole was intended to test. The entire hole (395 m, 1296 feet) cored metabasalt.

(14) Dungannon Exploration Limited

(a) M. L. 1297, Upsalquitch Property 21 O/8W

This property covering a small Zn-Pb-Ag prospect is under option to the South Bathurst Joint Venture (SBJV) (see Open File Report 80-4, p. 50). Work reported for 1980 consists of Max-Min II EM, magnetometer, and VLF-EM surveys.

A magnetic anomaly 500 m long was outlined in the southwest part of the licence. The VLF-EM surveys indicated formational contacts and minor disseminated pyrite and pyrrhotite. The Max-Min survey over the strongest VLF and magnetic anomalies indicated out-of-phase responses.

(b) Upsalquitch Property 21 O/8W

This claim group is under option to the South Bathurst Joint Venture who carried out reconnaissance geological mapping and VLF-EM in 1981.

The claims are underlain by poorly exposed polydeformed felsic tuffaceous rocks comprising quartz "eye" tuff quartz feldspar porphyry and crystal tuff and minor dark metasedimentary rocks.

The electromagnetic survey outlined several weak anomalies, but only one is thought to be significant.

(c) Upsalquitch Property 21 O/8W

This property is under option to the South Bathurst Joint Venture. Work reported comprises a VLF-EM and magnetometer survey of the 9-claim group. The VLF survey outlined one bedrock anomaly, probably related to a contact. The magnetic survey was negative.

(d) Mining Licence 1303 21 O/8W

Work reported was carried out by the South Bathurst Joint Venture.

VLF-EM, magnetometer and soil geochemical surveys were completed, and a drill hole was put down to test the best magnetic-electromagnetic-geochemical anomaly. The drill hole cut quartz feldspar metaporphyry, quartz metaporphyry and intercalated mafic volcanics and chloritic tuffs. The geochemical and geophysical anomalies are explained by 2 to 6 per cent disseminated (locally 15 per cent) pyrite-pyrrhotite over 42 m (139 feet) of core.

(15) Dungarvon Resources Limited

Mining Licence 1315 21 J/10E, 21 J/15E

Work reported in 1981 comprises three drill holes and a detailed examination of the core. The holes were put down to test targets located previously by Bagdad Exploration Association (Home Oil Ltd. and Aquitaine Company of Canada Ltd., see Open File Report 80-4, p. 56).

The drill holes tested east-west-trending coincident VLF-EM-scintillometer anomalies where they intersected weak resistivity anomalies. The holes cut fresh and altered medium to coarse-grained biotite granite. The alteration and fracture zones appear to cause the VLF-EM and resistivity anomalies. The uranium mineralization is thought to be fracture and/or joint controlled. Accessory minerals are pyrite, pyrrhotite, scheelite and hematite.

(16) Canadian Occidental Petroleum Limited

(d) Shawn Group 21 O/2W

This group, underlain by Devonian granite-granodiorite and its contact aureole, was originally staked in 1979 because of anomalous uranium, lead, molybdenum, zinc and silver in stream silts. Follow-up prospecting uncovered float containing Pb-Zn-Cu sulphide, molybdenite and autunite (hydrous uranium-calcium phosphate).

Early work comprises sampling of water and silt from streams and lakes, soils and rocks, geological mapping, scintillometer surveying and geochemical surveying. A significant Ag, U, Mo, Zn, Pb and Mn soil anomaly was outlined in the northwest and central part of the property.

Trenches indicated that the altered phase of the granite seems to be the source of the base metal-uranium anomalies. More detailed geophysical and geochemical surveys and prospecting are recommended.

(h) Bear Claim Group 21 O/2W

This large property (90 claims) is underlain by Devonian granite and its contact metamorphic aureole of Ordovician sediments.

The 1981 assessment work comprises wood and soil sampling surveys. Samples were analyzed for uranium. The results show west-northwest to northwest-trending U soil anomalies that are thought to be due to faults that originally controlled minor hydrothermal mineralization. The wood samples did not reveal definite U anomalies.

(i) Serpy Group 21 0/2W

A stream silt sample containing 2095 ppm uranium, collected in a regional survey by the company, drew attention to this area in 1971. The 1979 follow-up survey, although failing to confirm the original anomaly, located a radioactive spring downstream on Wrights Brook (water samples contained 23 ppb uranium). Silt samples from the same area contained up to 1400 ppm uranium.

Geochemical soil, water and rock surveys, together with geochemical and scintillometer surveys, were carried out in 1980.

The group is underlain by Ordovician granite that intrudes Ordovician metasediments. Two areas with anomalous soil uranium were found. They are thought to be related to NNW-SSE fracture zones in granite. The scintillometer anomalies reflected areas with thinner regolith.

Silification and pyrite-pyrrhotite-chalcopyrite-sphalerite concentrations occur in northwesterly-trending zones cutting the granitic pluton. Detailed studies in some trenches also revealed covellite, matildite ($AgBiS_2$), arsenopyrite and native bismuth. Fluorite and cassiterite are also reported. Autunite-torbenite (hydrous calcium uranium phosphate) occurs in the silicified (chalcedony-jasperoid) zones in quartz monzonite, muscovite, granite and altered "rhyolite".

The work reported comprises geological mapping, trenching (19 trenches), geochemical sampling of soil and rock and a scintillometer survey. The results indicate the most promising area for sulphide stockwork deposits and/or uraniferous silicified zones lies in the southwestern part of the claim group and the adjoining Shawn Group (see p. 76).

(j) Long Group 21 0/2W

This area has interested exploration companies since 1955 when a heavy metal water anomaly led to staking by the Anthonian Mining Company. Since then, Cominco and Canadian Occidental Petroleum have investigated several geochemical and geophysical indications of base metal and uranium mineralization. Several drill holes have been put down by Anthonian, Cominco and Canadian Occidental to test a variety of geophysical and geochemical targets.

The current campaign by Canadian Occidental Petroleum reveals that the area is underlain by various phases of Devonian granitic rocks which intrude Cambro-Ordovician sedimentary rocks. The granitic pluton is itself intruded by NNE-trending altered porphyritic "rhyolite" and muscovite granite dykes.

(17) Mattagami Lake Explorations Limited

(a) Area "L" 21 O/1E

Work reported in 1981 comprises line cutting, geochemical soil, geological, EM-16 and magnetometer surveys.

The claims are underlain by a southeasterly trending deformed belt of intercalated rhyolite, crystal tuff, quartzite and siltstone (graphitic) apparently overlain by mafic volcanics.

The EM results indicate several anomalies but trenching is only recommended on two of them.

(b) Area "K" 21 O/1E

Three target areas were outlined in this group. Each area was covered by radem (VLF-EM) magnetometer, geochemical and geological surveys.

Three northwesterly trending rock units were outlined: siltstone-greywacke, mafic tuff and rhyolitic volcanics.

The soil geochemistry revealed one anomaly over 180 m (600 feet) in the K II area.

(c) Area "A" 21 P/12W

Work reported consists of analyses of 10 soil samples and 9 rock samples obtained from trenches. The trenches were excavated to investigate an EM conductor outlined earlier. Correlations between Cu, Pb, Zn and Ag content of soil and rock is not clear. The graphite content appears to explain the EM anomaly.

(d) Hope Area "D" 21 P/12W

Three trenches were excavated presumably to test electromagnetic and geochemical anomalies. The bedrock in each case was graphitic siltstone.

(18) Gulf Minerals Canada Limited

Boiestown Block II 21 J/7W, 21 J/10W

Geological, geochemical (soil and rock), and geophysical samples were carried out on this 68-claim block in 1980-81. Reconnaissance geological mapping was also carried out in the surrounding terrain.

The property is underlain by deformed and weakly metamorphosed Cambro-Ordovician quartzites, siltstones, greywackes, slate, conglomerate and felsic volcanics overlain by Middle Ordovician grey and black slate and black cherty siltstone. The supracrustal rocks are intruded by Devonian muscovite granite and pyroxenite dykes. Minor pyrite occurs in all rocks. Rocks were analyzed for F, Co, Ni, Cu, Zn, Mo, Ag, Sn, Sb, W, Pb, Bi, U and Th.

Soil samples collected from both "A" and "C" horizons were analyzed for U, Th, Co, Bi, Ni, Sb, Mo, W, Cu, Pb and Zn.

Extensive U, Co, Bi, Sb, Mo, Pb and Cu anomalies were outlined. Pb anomalies are strongest in "A" horizon samples. The bedrock source of these anomalies was not found.

An EM-16 survey outlined six strong conductors apparently reflecting graphitic sedimentary layers.

(19) Clearwater Mines Limited

M. L. 1231, Canoe Landing Lake 21 O/8E

This property covers a pyritic massive sulphide deposit containing small amounts of Pb and Zn minerals. It was discovered in the late 1950's and has been investigated by several drill holes since then.

The property was optioned by Brunswick Mining and Smelting in 1981. Work reported for 1981 consists of line cutting and a Max-Min electromagnetic survey. Several conductors were outlined.

EXPLORATION ACTIVITY IN SOUTHERN NEW BRUNSWICK

GENERAL

In spite of the national economic decline, mineral exploration remained relatively active in southern New Brunswick during 1981. There were some significant new mineral discoveries and several extensive claim groups were staked.

Potash Company of America proceeded with preparations for bringing their Penobsquis salt-potash deposit in production. The Denison-Potacan exploration shaft in the Salt Springs potash-salt deposit was nearly completed. BP Exploration Canada Ltd. initiated a successful diamond drilling program in their Millstream salt-potash deposit.

Billiton Canada Ltd. continued mill construction and underground work at the Mount Pleasant tungsten-molybdenum-tin deposit. MEX Exploration discovered an economically interesting tin deposit at Pleasant Ridge, west of Mount Pleasant.

Consolidated Durham Mines and Resources Ltd. completed delineation of their newly discovered antimony orebody north of the Lake

George mine. This company also discovered a large low-grade scheelite-bearing skarn deposit in this area. Prospectors Robert Connor and Ronald Morrison discovered several similar low-grade scheelite occurrences in the Coac Stream-Upper Caverhill area near Nackawic.

MIRAMICHI ZONE SOUTH

(1) BP Minerals Ltd.

Eel River 21 G/13E

The Eel River Group is situated about 80 km west of Fredericton. The area is underlain by Cambrian-Ordovician, intensely folded, metasedimentary and metavolcanic rocks of the Tetagouche Group that host massive sulphide deposits in the Bathurst area. Kenneth Whaley found small amounts of galena, chalcopyrite and sphalerite in the Eel River area. BP Minerals conducted a detailed geological survey of the claim group. It was found that the stratigraphic succession at Eel River is similar to the Bathurst area. Iron formation that commonly accompanies base metal sulphide mineralization is preserved in two southwest-plunging synclines near Meductic. Investigations of known EM anomalies on the property have so far not led to the discovery of an economic ore deposit, but the property merits further investigation because of its favourable geology.

MAGAGUADAVIC ZONE

(2) Brunswick Mining and Smelting Corporation Ltd.

(a) Canterbury 21 G/14W

The Canterbury Group is situated between the south side of the Saint John River and the town of Canterbury, along the northern contact of the Devonian Pokiok Batholith. Highly anomalous amounts of copper, lead and zinc were found in the vicinity of Canterbury during 1981. Some of the anomalous values probably resulted from accumulation in swamps, others occur near old settlements, but a few anomalies may be related to mineralization in bedrock. More work is planned to investigate the latter possibility.

(b) Davidson Lake 21 G/14E

The Davidson Lake Group is situated in the Pokiok Batholith, 10 km south of Nackawic on the Trans Canada Highway. The property is underlain by Devonian equigranular and porphyritic biotite and biotite-muscovite granite. A younger and more highly fractionated muscovite-biotite granite outcrops east of the property across the Saint John River. The granite at Davidson Lake is well-jointed and intensely sheared in places. Secondary white mica, saussuritization of plagioclase, chloritization of biotite and kaolinization of potash feldspar are reported. Pyrite and molybdenite occur as local disseminations or along fractures. Trenching, magnetic, VLF-EM, IP geochemical surveys and geologic mapping were carried out. As a result of this work several intensely altered zones associated with faulting and shearing were delineated. Geochemical anomalies for uranium, molybdenum, tungsten and tin are associated with these altered zones.

(c) Scotch Lake 21 G/14E
(d) Joslin Creek 21 G/14E

These claim groups are respectively northeast and southeast of the Davidson Lake Group and immediately north of the Lake George antimony and tungsten deposits. This ground is situated in a favourable structural zone and is intruded by late phases of the Pokiok Batholith. No exploration results were reported at the time of writing this report.

(e) Lake George 21 G/14E

This property is immediately west of the Lake George antimony-tungsten property, about 40 km west of Fredericton. The property is underlain by Silurian hornfelsic greywacke and slate. A till sampling survey for Sn, W, Mo, Au, Cu, Pb, Zn, Ag, U and Sb was carried out on the property. About 25 pounds of samples were collected from a depth of about 4 feet. The samples were screened to 8 mesh and the finer fraction was panned down to 100 grams and further concentrated with heavy liquids. Magnetite was removed from the concentrate and the remainder was pulverized and chemically analyzed. The results of the analysis were not available at the time of writing this report.

(3) Consolidated Durham Mines and Resources Ltd.

Lake George Group 21 G/14E

Consolidated Durham completed delineation of an antimony orebody northwest of the Lake George Mine workings. Mining of this newly discovered orebody will require deepening of the present shaft or sinking a new one. Northwest of and below this newly discovered ore zone an altered granite porphyry and hornfelsic zone was intersected. The porphyry and hornfelsic zone contain numerous quartz-calcite diopside-hedenbergite, tremolite-actinolite and scheelite-bearing veins.

(4) Robert Connor and Ronald Morrison

Coac Stream-Upper Caverhill 21 G/14E

Several low-grade scheelite occurrences were found recently by Robert Connor and Ronald Morrison in the Coac Stream-Upper Caverhill area, north of the Saint John River near Nackawic. These occurrences are associated with the youngest phase of the Devonian Pokiok Batholith.

(5) Cuvier Mines Inc.

Magaguadavic Lake 21 G/11W

Cuvier Mines staked a prominent airborne anomaly west of Magaguadavic Lake. The property is situated in Devonian porphyritic biotite and biotite-muscovite granite west of the prominent northerly trending Magaguadavic Fault.

Soil samples were collected and analyzed for molybdenum, copper, lead and zinc. Some weakly anomalous molybdenum values were detected. More detailed sampling and geologic mapping of the property was recommended.

ST. CROIX ZONE

(7) Billiton Canada Ltd.

(a) Tower Hill 21 G/6E

The Tower Hill claim group is about 10 km northeast of St. Stephen. The property is underlain by biotite-muscovite granite that intrudes the Lower Ordovician Cookson Formation. The Cookson is metamorphosed to biotite and staurolite-andalusite schist near the granite contact. Quartz and greisen veins occur in the western part of the intrusion. Molybdenite is locally exposed and some anomalous tin values were found by assaying. Two holes were drilled to test anomalies in the greisen zones. Anomalous amounts of tin up to 79 ppm was found, but no ore grade material was intersected.

(b) Pleasant Ridge 21 G/6E & 7W

The Pleasant Ridge-Sorrell Ridge Group is about 20 km west of Mount Pleasant in northern Charlotte County. The group covers two granite porphyry stocks that intrude respectively Ordovician and Silurian sedimentary rocks. Petrochemistry of the Pleasant Ridge intrusion by the Geological Surveys Branch has shown this is a very fractionated granite, high in Rb and low in Sr and Ba. Five holes were drilled to test geochemical anomalies. Up to 450 ppm Sn and 50 ppm W were intersected over 5 feet, but no ore grade material was found. However, MEX Exploration Ltd. discovered a prominent tin-bearing occurrence along the southeastern contact of this intrusion, which indicates that further exploration is warranted in this area.

(c) Niles Brook 21 G/7W

The Niles Brook property is about 5 km north of the Mount Pleasant tungsten-molybdenum mine. The area is mostly underlain by rhyolite tuffs. A caldera margin breccia underlies the tuffs along the west side of this claim group.

Anomalous amounts of tin, molybdenum, zinc and lead were found here more than 20 years ago. Although chlorite, epidote and silica occur as alteration minerals in fractured rocks, no evidence of tin, tungsten, molybdenum or base metal sulphide minerals was found in bedrock.

(8) Shell Canada Resources Ltd.

(a) Foster Lake 21 G/6E

Shell Canada holds a large group of claims covering the northern contact zone of the Tower Hill granite. Geochemical anomalies detected in till samples suggest the presence of tungsten and tin minerals in the exocontact zone.

(b) Magaguadavic River 21 G/7W

Shell staked an extensive claim group west and east of the Magaguadavic River near Pomeroy Bridge about 12 km west of Mount Pleasant. These claims surround the tin-bearing fracture zone discovered by MEX Exploration Ltd. in this area.

(c) South Oromocto Lake 21 G/7W

Shell explored an extensive claim group south of Mount Pleasant and west of South Oromocto Lake. The area includes part of the northern contact zone of the St. George Batholith, a large roof pendant of Silurian metasedimentary rocks in this intrusion and Carboniferous felsic volcanic rocks and intrusive equivalents. In 1979, Mr. Merton Stewart of MEX Exploration Ltd. discovered high grade argentiferous lead-zinc-sulphide-bearing veins in Silurian metasedimentary float. Shell carried out a heavy mineral sampling program mainly to determine the tin-tungsten potential of the ground. Interesting anomalous values were found in the McDougall Inlet, Cundy Lake and Little McDougall Lake areas.

(16) MEX Exploration Ltd.

(a) Pomeroy Bridge 21 G/7W

MEX Exploration found a 3 m wide shear zone containing tin minerals, base metal sulphides, hematite and magnetite that cuts across Silurian sedimentary rocks southeast of the Pleasant Ridge granite stock. The deposit is hosted by Silurian greywacke and slate. No assay results were reported at the time of writing this report. The company also conducted an extensive soil geochemical survey.

(b) Piskahegan River 21 G/7W

MEX Exploration staked another group of claims in the Piskahegan River area. The company conducted extensive prospecting and soil geochemical work on this ground. Anomalous amounts of molybdenum and tin were found.

(17) Beth-Canada Mining Company

True Hill 21 G/7W

The True Hill Group is situated immediately west of Mount Pleasant. Tin and base metal sulphides were first found by Mount Pleasant Mines Ltd. in 1962. Subsequent trenching in conjunction with geochemical and induced polarization surveys delineated two zones composed of highly brecciated and altered felsic porphyry that cut Silurian metasediments. Some of the mineralized rocks in these zones assayed up to 2% tin. Billiton Canada Ltd. has acquired the property recently from Beth-Canada.

(15) Rio Tinto Canadian Exploration Ltd.

(a) Digdeguash River 21 G/6E
(b) Flume Falls 21 G/6E & 7W

Rio Tinto staked claim groups along the Digdeguash River south of Lawrence Station and at Flume Falls northwest of Pomeroy Bridge. No work was reported on these claims at the time of writing this report.

(9) Goldfluor Exploration Ltd.

(a) Central Tower Hill 21 G/6E

Goldfluor Exploration Ltd., owned by Reginald Cox of Saint John, continued exploration in the Central Tower Hill area. Arsenopyrite- and gold-bearing quartz veins cut across Ordovician sedimentary rocks in this area.

(b) Navigation Lake 21 G/3E

Goldfluor explored a claim group in the Devonian Bocabec Igneous Complex immediately west of the St. George Batholith. This area is underlain by Devonian gabbro intruded by granodiorite. Arsenopyrite- and fluorite-bearing quartz veins cutting the intrusive complex were prospected for gold.

(10) MEX Exploration Ltd.

Bonaparte Lake 21 G/3E

MEX Exploration Ltd. prospected the Bocabec Intrusive Complex southwest of the Goldfluor claim group. No results were reported at the time of writing this report.

(14) Westmin Resources Ltd.

Lily Lake-Trout Lake 21 G/2W

Some highly anomalous amounts of uranium were detected in some spring and stream sediment samples in the southern part of the St. George granite batholith near Lily Lake. A narrow altered (clay and hematite) band with above background radioactivity was found near Trout Lake. A weak IP anomaly was tested by drilling, but only background radioactive values were detected in the core.

(19) Shell Canada Resources Ltd.

Victoria-Mistake Lake 21 G/7E

This claim group is situated in the central part of the Carboniferous granitic complex that comprises the eastern part of the St. George Batholith. Tin-bearing greisen veins were first found in this area in the course of a Department of Natural Resources (Sussex Regional Office) geologic mapping program several years ago. MEX Exploration Ltd. subsequently found two prominent greisen vein swarms in the Victoria and Mistake Lake areas respectively. During 1981, Shell conducted an extensive till sampling program for tin and tungsten in this area which resulted in the discovery of several anomalies that merit detailed follow-up.

(20) Uranerz Exploration and Mining Ltd.

(a) Sandbrook Mountain 21 G/7E

Uranerz conducted an extensive uranium exploration program on their Sandbrook Mountain claim group northeast of South Oromocto Lake. The area is underlain by Middle Devonian and Lower Carboniferous granitic rocks of the St. George Batholith and a Silurian metasedimentary roof pendant. An airborne VLF-EM, magnetic and radiometric survey was conducted over the property. The geology was mapped and systematic radiometric ground traverses were done to check the airborne anomalies. No economically significant accumulations of radiometric minerals were found along a shear zone detected by VLF-EM near Sand Brook Mountain. A single high value of 1850 ppm was produced by a clay horizon.

(b) Browns Flats 21 G/8E, 21 G/9E

Uranerz continued investigation of a claim group in the Browns Flats area west of Evandale. This prospect occurs along the southern contact of the Devonian Mount Champlain complex that is composed of Devonian alkali granite and quartz syenite. The property was intensely explored, but no significant amounts of uranium minerals were found.

(21) Westmin Resources Ltd.

(a) Falls Brook 21 G/8W

This claim group was staked in Carboniferous granitic rocks of the eastern St. George Batholith. The favourable younger phases of the granitic complex outcrop in this area. Some molybdenite occurrences were found in this area in the course of geologic mapping. Radiometric, magnetic and VLF-EM surveys were carried out, but no uranium occurrences of economic interest were found.

(b) Caribou Lake 21 G/8W

Westmin holds a group of claims between Caribou Lake and Trout Lake, east of the Victoria Lake-Mistake Lake tin-bearing greisen belt. Ground VLF-EM, magnetometer, radon, and scintillometer surveys and geologic mapping were carried out. VLF-EM conductors were checked by IP resistivity profiling. A 115° striking, steeply dipping structure in fractured and intensely altered granite was intersected by two diamond drill holes, but no uraniferous minerals of economic interest were intersected.

(22) Billiton Canada Ltd.

Square Lake 21 G/8W

Billiton continued exploration of their Square Lake claims group near Welsford. Several Carboniferous granite phases are exposed in this area. Numerous easterly striking tungsten- and tin-bearing greisen veins occur within and along the contacts of the youngest porphyritic phases in the complex.

(24) Canadian Nickel Company Ltd.

Wedderburn Lake 21 G/8W

Canadian Nickel explored a claim group in the Wedderburn Lake area. This area is underlain by Carboniferous granites similar to those at Square Lake to the west. The company conducted a soil sampling program, but results were not reported at the time of writing this report.

(18) Canadian Nickel Company Ltd.

Bear Lake 21 G/2E

Several phases of Carboniferous granite are exposed in the Bear Lake area. Canadian Nickel is exploring this area for tin- and tungsten-bearing greisen deposits.

(25) J. J. Dolan

Nerepis Prospect 21 G/8W

MEX Exploration Ltd. conducted a sampling program on the molybdenite-fluorite-bearing greisen zones along the contact of the Carboniferous granite and Silurian sedimentary rocks at Nerepis. Cobalt minerals are exposed in a creek bed immediately west of Deep Lake. Soil sampling in this area delineated a uranium anomaly, some weakly anomalous cobalt and anomalous amounts of tin (up to 145 ppm) on several parts of the grid. The tin anomalies west and southwest of Deep Lake occur in Carboniferous granite with associated narrow greisen zones.

(26) BP Exploration Canada Ltd.

Capple Lake 21 G/8W

BP Exploration holds a group of claims along the contact of the Carboniferous granite and Silurian sedimentary rocks south of the Dolan property at Nerepis. The silt samples were analyzed for copper, lead, zinc, molybdenum, iron, tin, uranium, tungsten, antimony and bismuth. The heavy mineral separates were analyzed for tin. Anomalous molybdenum, tin, lead and uranium values were found in the area bounded by Capple Lake, Brittain Creek and Sister Mountain. The results suggest that the property has considerable potential for greisen-related deposits.

(27) MEX Exploration Ltd.

Caribou Lake 21 G/8W

MEX Exploration explored a claim group in Carboniferous granite at Caribou Lake, which is immediately south of the Billiton Property at Square Lake and west of the Dolan prospect at Nerepis.

(20) Dome Exploration (Canada) Ltd.

Fanny Brook 21 G/9E

Dome continued exploration of their claims covering the Evandale copper-molybdenum-tungsten-bearing zone. This mineralized zone is about 500 m wide and 2700 m long and it occurs in highly fractured Devonian granodiorite that intrudes Silurian sedimentary and volcanic rocks. Phyllic and argillic alteration typical in porphyry copper deposits has been recognized. In addition to chalcopyrite and molybdenite that occur widespread as disseminations and joint coatings, there are quartz veins with chalcopyrite, sphalerite, galena and molybdenite. Some of these quartz veins contain varying amounts of scheelite.

(11) Peter Sternberg

(a) Letete 21 G/2W

Petrochemical studies delineated two hydrothermally altered zones in the Silurian volcanic rocks in the Letete area of the Mascarene Peninsula south of St. George. These anomalies are characterized by distinct Na_2O depletion and MgO enrichment. Base metal sulphide occurrences outcrop in the vicinity of these anomalies.

(b) Anderson Mountain 21 G/2W

A small claim group in Lower Devonian volcanic rocks at Anderson Mountain was explored, but the results were not reported at the time of writing this report.

(12) BP Exploration Canada Ltd.

Anderson Mountain 21 G/2W

The company mapped the geology of the property in detail, and carried out a silt sampling program. Numerous quartz veins with galena and sphalerite were mapped. Some fluorite-bearing samples are also anomalous in molybdenum and tin. It is possible that the mineralization in the area is associated with a volcanic centre resembling Mount Costigan in northern New Brunswick.

CENTRAL PLATFORM

(30) Billiton Canada Ltd.

(a) Mount Pleasant 21 G/7W

In addition to preparing the tungsten-molybdenum orebody for production, the company investigated the property for its tin potential. In addition to the previously discovered tin-base metal sulphide deposits in the shallow parts of the deposit, assemblages of cassiterite, topaz, chlorite, fluorite with or without biotite have been found in apical zones of fine- and medium-grained granite in the deeper parts of the mine.

(b) Niles Brook 21 G/7W

Billiton continued exploration in the Carboniferous rhyolitic volcanic rocks north of Mount Pleasant, but no discoveries of economic interest were reported.

(33) Sullico Resources Ltd.

Little Mount Pleasant 21 G/7W

This property is situated in Carboniferous volcanic rocks about 2 km southeast of Mount Pleasant. Two holes were drilled to test the extent of an anomalous zinc, lead and molybdenum sulphide zone encountered in the course of previous drilling. Both holes intersected lead and zinc sulphides and trace amounts of tungsten and molybdenum. It is possible that tungsten and molybdenum minerals occur at greater depth or more proximal to the volcanic centre in the area.

(31) Shell Canada Resources Ltd.

(a) Mud Lake 21 G/10W

A large, intensely altered breccia pipe, resembling hydrothermally altered breccias immediately above the Mount Pleasant tungsten-molybdenum deposits, outcrops on the claim group held by Shell Canada east of Mount Pleasant. This ground undoubtedly has potential for a Mount Pleasant type deposit. No results of drilling or other exploration activity were reported at the time of writing this report.

(b) Mill Settlement 21 G/10E

Shell Canada explored a claim group in the Mill Settlement area. Geologic mapping by the Geological Surveys Branch (Sussex Office) and drilling by Rio Tinto Canada Ltd. delineated a prominent hydrothermally altered conduit between a basalt flow and a dense siltstone unit (roughly stratabound) that contains small amounts of radioactive minerals. At a greater depth, this conduit may have potential for tin-tungsten-molybdenum deposits similar to the McNamara Shin Creek prospect immediately to the west.

(32) J. D. Irving Ltd.

McDougall Inlet 21 G/7W

J. D. Irving Ltd. explored a claim group east of the Shell Canada South Oromocto Lake property. This ground is situated in the belt with potential for tin-tungsten-molybdenum deposits between Mount Pleasant and West Mill Settlement.

(34) MEX Exploration Ltd.

Blind Lake 21 G/7W

MEX Exploration explored a large claim group in the Blind Lake area east of the Shell Canada South Oromocto Lake Group. Wolframite-bearing quartz-greisen veins similar to those at Burnt Hill in northern New Brunswick have been found in this area.

(36) H. C. McNamara

Shin Creek 21 G/10E

The McNamara prospect constitutes a Carboniferous sub-volcanic complex resembling Mount Pleasant, but still mostly overlain by extrusive pyroclastics. At Mount Pleasant the latter rocks have mostly been removed by erosion. Drilling through the extrusives intersected molybdenite-bearing (.25% Mo) silicified porphyry similar to that in the main ore zone at Mount Pleasant. Billiton drilled an additional five holes in the property. In these drill cores, numerous thin siliceous breccia dykes similar to those found at Mount Pleasant, cut the extrusive pyroclastic sequence. The nature and widespread distribution of these breccia dykelets indicate that they are associated with a sub-volcanic complex of similar type as the one at Mount Pleasant. Extensive deep drilling is required, however, to explore this sub-volcanic complex for tin, tungsten and molybdenum minerals.

(29) Cominco Ltd.

(a) Kedron Lake-Shin Creek 21 G/6E, 21 G/11E

Cominco holds a large claim group between Kedron Lake and Shin Creek, about 50 km south of Fredericton. The area is underlain by gently dipping Carboniferous fluviatile sedimentary rocks and felsic volcanics. Diamond drilling, auger/diamond drilling and trenching were conducted over an extensive radon anomaly last year. No 1981 work was reported at the time of writing this report.

(b) Rusagonis-French Lake 21 G/15E

This claim group is about 15 km south-southeast of Fredericton. The area is underlain by gently dipping Pennsylvanian fluviatile shale, sandstone and conglomerate. The company conducted a small diamond drilling program, but no significant amounts of radioactive minerals were intersected.

(52) Campbell Resources Inc.

Campbell Resources Inc. holds several claim groups in the Upper Precambrian Eastern Volcanic Belt of the Caledonia Highlands in southeastern New Brunswick. VLF-EM, Max-Min-HLEM and magnetic ground surveys were conducted on several claim groups.

(a) Quiddy River 21 H/11E

This small claim group in Upper Precambrian volcanic and sedimentary rocks of the Caledonia Highlands was staked because of some copper sulphides that were found here in the 1960's. Stream sediments were collected, ground magnetic and electromagnetic surveys were carried out and eight short holes (packsack) were drilled. Small amounts of base metal sulphides were intersected. On the basis of poor geophysical results, no further work was recommended.

(b) Old Vernon Mine 21 H/11E

This claim group includes the area of the "Old Vernon Copper Mine", a high-grade copper-bearing quartz-carbonate vein that was mined around the turn of the century. The vein cuts across intensely deformed Precambrian felsic and mafic volcanic rocks. During the past summer, the area was prospected, some silt samples were collected and exposed veins were sampled. In addition to copper sulphides, very small amounts of gold (.01 ounces/ton) were found. Further work was recommended.

(c) Goose Creek 21H/11E

This claim group was staked in 1979 to cover a copper-silver-gold occurrence. A Max-Min-HELM conductor was delineated on the property. Altered rocks were sampled and 28 samples were assayed. Anomalous zinc and copper values were found in several samples, but no ore grade material was encountered.

(d) Upper Goose Creek 21 H/11E

This claim group covers two prominent base metal sulphide occurrences. VLF-EM, Max-Min-HELM and magnetic surveys were conducted on the ground. A relatively weak conductor was delineated on strike with a known mineral occurrence. The drilling of at least one hole was therefore recommended to test the anomaly.

(e) Old Lumsden Mine 21 H/15W

The Lumsden claim group includes a small copper-lead-zinc deposit. Around 1945, the deposit was trenched, drilled and explored by a short adit. Campbell Resources restaked the ground in 1979. VLF-EM, Max-Min-HELM and magnetic surveys were carried out on the claims. The earlier discovered mineralized zone is reflected by a poorly conductive zone. Drilling of the conductor on strike with the known mineralized zone was recommended.

(48) Brunswick Mining and Smelting Corp. Ltd.

Quispamsis 21 H/5W

This property is intruded by granodiorite, diorite and minor granite of Silurian or younger age, and Mississippian or older clastic sedimentary rocks and minor limestone. Base metal sulphides occur in Precambrian limestone inclusions in fractured and altered granite. A soil geochemical survey conducted on the property delineated a broad anomalous zone.

(41) J. J. Dolan

(a) Musquash Harbour 21 G/1W

J. J. Dolan continued to hold his Musquash Harbour gold prospect along the Bay of Fundy coast, west of Saint John. Gold, galena and chalcopyrite occur as disseminated grains in quartz veins cutting granitoid rocks.

(b) Eagle Lake 21 G/8W

J. J. Dolan continued exploration of his Eagle Lake porphyry-copper-molybdenum prospect at Eagle Lake north of Musquash. Chalcopyrite and some molybdenite occur in highly fractured and altered parts of the intrusion.

(43) W. G. Walton

Musquash Harbour 21 G/1E

W. G. Walton continued exploration of a gold prospect in the Musquash area.

(46) Morton Gordon

Cape Spencer 21 G/4W

Mr. Morton Gordon continued exploration of a gold prospect in the Cape Spencer area. Several pyrite- and gold-bearing quartz veins, cutting the Carboniferous Mispeck Group, are exposed in this area. Several trenches were excavated and the veins sampled. Assay results were not released at the time of writing this report.

(50) J. D. Irving

Nauwigewauk 21 H/5W

J. D. Irving continued to hold a limestone deposit in the Nauwigewauk area. This prospect covers part of the Precambrian Green Head Group which contains high grade dolomitic limestone in several localities.

(53) Kidd Creek Mines Ltd.

Teahans Corner 21 H/10W

Kidd Creek Mines started exploration on the Old Teahan Mine prospect. This is a highly deformed base metal sulphide-bearing zone in Upper Precambrian volcanic rocks.

MONCTON-CUMBERLAND BASIN

(60) Potash Company of America

Plumweseep-Penobsquis Concession 21 H/11W, 14W, 14E

Drifting along the sylvinite ore zone augmented by underground drilling confirmed a mineable orebody at the PCA concession in the Plumweseep-Penobsquis area near Sussex. This orebody occurs in the upper part of the Mississippian Windsor Group. As a result of this successful exploration program, the company proceeded with the sinking of a production shaft and mill. Mining of salt will be started in the fall of 1982, and potash production is expected to be initiated in the spring of 1983.

(54) Denison Mines Ltd.

Salt Springs Concession 21 H/12E

The Denison Mines shaft near Cassidy Lake, about 16 km southwest of Sussex, was nearly completed during 1981 despite severe water problems encountered in a highly fractured rock unit. It is expected that drifting augmented by underground drilling to establish the presence of a mineable orebody will be completed in the fall of 1982. In 1980, Denison Mines Ltd. sold 40 per cent of their interest in this property to Potash Company of Canada Ltd., a company jointly owned by Enterprise Minière Chemique (France) and Kali und Salz Ag (West Germany).

(57) BP Exploration Canada Ltd.

Millstream 21 H/12E

BP Canada holds a concession to search for sylvinite and salt in the Windsor Group of the Millstream area, 4 km west of Apohaqui, Kings County. In 1981, the company successfully completed five diamond drill holes in the deposit.

(55) Uranerz Exploration and Mining Ltd.

Wards Creek 21 H/12E

This prospect occurs in Upper Devonian and Lower Carboniferous fluvial, fluvial deltaic and lacustrine sedimentary rocks which appeared to constitute a favourable environment for uranium mineral accumulation. Radiometric surveys followed up by diamond drilling (1097 m) led to the discovery of small amounts of radioactive material, but no economic ore deposits.

(58) Gulf Minerals Canada Ltd.

Lower Millstream 21 H/12E

Gulf Minerals explored a claim group underlain by Upper Devonian and Lower Carboniferous fluviatile and lacustrine sedimentary rocks. Canadian Nickel Company previously held this ground and intersected small amounts of uranium minerals in diamond drill cores. Gulf conducted a geochemical survey and drilled five holes (704 m), but no deposit of economic interest was found.

(61) St. Lawrence Cement Company Ltd.

Dunsinane Coal 21 H/14W

The Dunsinane coal deposit is situated in Pennsylvanian sedimentary rocks about 17 km northeast of Sussex. Drilling and mining of small quantities of coal were carried out after its discovery in 1865. During 1981, four holes were drilled in the western and southern part of the claim group covering the deposit. Two of these holes intersected coal-bearing beds varying in thickness from 2 to 14 inches. The remaining two holes did not intersect coal.

(65) Canadian Nickel Co. Ltd.

Berry Mills-Shediac River 21 I/2W

Canadian Nickel holds a large group of claims extending from Salisbury northeasterly to Irishtown. The area is underlain by Pennsylvanian fluviatile sedimentary rocks. Highly anomalous amounts of uranium were found in stream sediments in the course of a geochemical survey conducted in the area by the Geological Survey of Canada. Highly radioactive boulders containing up to 4 per cent uranium were discovered in the area during 1971 by BP Exploration Canada Ltd.

Canadian Nickel conducted regional geochemical and geophysical surveys and diamond drilling on the property during 1977, 1978 and 1979. This was followed by detailed surveys and diamond drilling of a number of selected drill targets. The detailed investigations consisted of soil sampling, alphameter (radon in soil) and scintillometer surveys. Drilling of soil anomalies did not intersect uranium mineral concentrations.

(73) Brunswick Mining and Smelting Corp. Ltd.

Cape Spear 21 L/4

Brunswick continued exploration on a large claim group underlain by Pennsylvanian fluviatile sedimentary rocks in the Cape Spear area of southeastern New Brunswick. Anomalous amounts of radioactive minerals were found in outcrops and drill cores. During 1980-81, a large number of soil samples were collected and analyzed for uranium. A total of 873 m of diamond drilling was carried out in eight holes. A reduced carbonaceous section, 5 cm wide, containing 190 ppm U, was the highest grade material intersected.

(71) H. R. Norrie

(a) Upper Sackville 21 H/16W
(b) Aulac 21 H/16W

H. R. Norrie continued his exploration for possible economic amounts of copper ores in peat bogs. Part of the claim group was drained by ditching and some copper-bearing peat was removed and partially dried. A burning process was used to reduce approximately 10,000 cubic feet of peat to ash in order to facilitate removal of the copper.

MINERAL OCCURRENCES

ZINC, LEAD, COPPER, SILVER OCCURRENCES

FLAT LANDING BROOK SULPHIDE DEPOSIT

(Sabina Industries and Essex Minerals)

LOCATION - Lat. 47°22.9'N; Long. 65°52.6'W

HISTORY AND DEVELOPMENT - Discovered in 1975 on a large property (417 claims) selected because of favourable geology. Massive sulphide float discovered in vicinity of airborne "input" anomaly (so-called "No. 11 area"). Ground geophysical surveys pinpointed target. Drilling carried out in 1975 and 1976. Management of exploration turned over to Essex by Sabina in September, 1976. Essex dropped their option in 1978. The property was optioned to Noranda in 1980.

COMPANY - Sabina Industries Limited (Vancouver, S.E.). Executive Office - 307, 8 King Street East, Toronto M5C 1B5. President - J. K. Campbell. Managing Director - W. W. Cummins. Authorized 5,000,000 shares. Issued 3,044,005 (135,000 escrowed).

PROPERTY - 417 claims (12,000 acres) optioned to Essex Minerals until 1978. Includes three packages (1) Sabina, 367 claims; (2) Smyth Option, 44 claims (includes M.L. 1171); (3) Duffy Option, 6 claims.

PRODUCTION - None

FINANCIAL - Under option deal between Sabina Industries and Essex Minerals (terminated 1978). Essex could have earned 100% interest by 1) $60,000 initial payment; 2) spending $750,000 by 1978; 3) advance royalties 1979-1983 of $2,100,000. Sabina will have net profit royalty interest in varying amounts subject to a buy-out clause whereby Essex can purchase Sabina's royalty for $20,000,000. Reported expenditures - 1975 ($210,639); 1976 ($170,000 minimum).

RESERVES -

	Probable Tonnage	Cu	Pb percent	Zn	Ag oz/ton
North Zone	900,000	0.04	1.71	6.94	0.89
South Zone	500,000	0.02	0.53	3.23	0.31

RESERVES - According to Essex Minerals in their final report, the reserves are as follows (cf 1976 estimate):

Tons	Pb%	Zn%	Ag oz/ton
1,930,000	0.94	4.9	0.57

DEVELOPMENTS - 1981 - Noranda Exploration is continuing their assessment of this deposit owned by Sabina Industries. Unofficially their results have been encouraging so far. Two diamond drills have been operating on the property since last fall. An important decision regarding the option has to be made in September or October, 1982.

HALFMILE LAKE SULPHIDE DEPOSIT

LOCATION - Lat. 47°25'N; Long. 66°19'W

HISTORY AND DEVELOPMENT - Discovered in 1955 by Texasgulf (Middle River Mining Company) as a result of a regional geological approach followed by airborne EM and follow-up ground EM. Bay Copper Mines found the down dip extension by drilling. Mineral dressing experiments carried out with limited success. Option agreement reached between two companies in 1974. Deep drilling program begun and continuity of sulphide body confirmed at depth. Consideration given in 1976 to 2,800-foot exploration shaft but plans were shelved.

COMPANY - Texasgulf Inc., Box 175, 5000 Commerce Court West, Toronto M5L 1E7. Chairman - C. R. Fogarty. President - R. D. Mollison. Vice President Exploration - G. W. Mannard.

Bay Copper Mines Ltd. (80% Conwest Explorations Co. Ltd.), 1001, 85 Richmond Street West, Toronto M5H 2G1. President - M. P. Connell. Billiton Exploration Canada now involved (1979).

PROPERTY - Mining licences 998 (Texasgulf) and 1010 (Bay Copper)

PRODUCTION - None

FINANCIAL - Option agreement Texasgulf to spend $100,000 per year for five years on combined properties. If a mine is brought into production, Bay Copper will retain 10% carried interest in profits. Beyond five years with no production, Texasgulf to pay Bay Copper a royalty of $250,000 per year.

RESERVES -

	Tonnage	Cu	Pb	Zn	Ag
			per cent		oz/ton
Texasgulf	5,200,000	0.39	2.49	6.57	
	1,000,000	2.00			
Bay Copper	1,600,000	0.32	2.9	7.7	

DEVELOPMENTS - Airborne EM survey flown 1975 (reported 1976) but no additional targets found.

DEVELOPMENTS, 1981 - A deal was announced in 1979 between Texasgulf and Billiton. The details, however, are not known. Several thousand feet of drilling has been carried out so far by Billiton.

OUTLOOK - It is likely that an exploration shaft will be constructed when the economic situation warrants.

KEY ANACON SULPHIDE DEPOSIT

LOCATION - Lat. 47°26.1'N; Long. 65°41.8'W

HISTORY AND DEVELOPMENT - Chalcopyrite near the Key Anacon deposit was discovered by H. Y. Hind in 1864. The main Pb-Zn deposit was found by drilling a ground E.M. anomaly in 1953, though the initial staking was based on an aeromagnetic anomaly. A 1,500-foot shaft was sunk and nine levels excavated. A feasibility study was carried out from 1970-73. No significant additional tonnage has been found.

COMPANY - Key Anacon Mines Limited, P. O. Box 937, Saint John, New Brunswick E2L 4E3. President: L. McC. Ritchie. Vice President: A. G. Kirkland.

PROPERTY - Mining Licence 1206

PRODUCTION - None

FINANCIAL - Incorporated as Anacon Lead Mines Limited in 1948 in Ontario. 10,000,000 shares @ 20¢ authorized. 8,166,157 issued. Name changed to Key Anacon Mines Limited in 1964 (3 old shares for one new). Capital increased in 1969 to 6,000,000 shares. Sixty per cent of shares owned by K. C. Irving.

RESERVES -

Tons (x10^3)	Cu	Pb	Zn	Ag
		per cent		oz/ton
	0.2	3.03	7.4	2.7
(Mines Handbook, 1977)				
939	0.42	2.35	5.98	2.5
(Proven ore according to N.B.R.P.C., 1970)				

DEVELOPMENTS - Key Anacon have continued to explore their property in recent years. Although they have clarified the structure and distribution of sulphide, the small size of the deposit is a drawback. Nothing new to report in 1981.

OUTLOOK - The small size of the deposit will hold back development of this mine unless favourable arrangements can be made to mill the ore elsewhere.

MURRAY BROOK SULPHIDE DEPOSIT

LOCATION - Lat. 47°31.5'N; Long. 66°25.8'W

HISTORY AND DEVELOPMENT - Discovered in 1956 by Kennco Explorations (Canada) Limited on a large property staked over airborne anomalies. Ground E.M. and soil geochemistry anomalies were outlined, but drilling revealed only graphitic schist. The discovery of massive sulphide float, followed by a detailed stream silt geochemical survey and trenching, led to the discovery.

A drilling program outlined a large low-grade massive sulphide body covered by a thick blanket of residual and transported gossan. The deposit was investigated at one stage as a pyrite deposit. Optioned to Cominco for a short time, but drilling did not appreciably alter tonnage given below. Optioned to Gowganda Silver Mines in 1973, whose obligations were taken on by Placer Development Corporation (formerly Canex Placer).

COMPANY - Kennco Explorations (Canada) Limited, P. O. Box 19, 2303 Commercial Union Tower, T.D. Centre, Toronto M5K 1A1 (subsidiary of Kennecott Copper Corp.). Gowganda Silver Mines Ltd. - 2500, 390 Bay Street, Toronto M5H 2W7. President - F. Martin; Vice President - C. Pielsticker (24% carried interest).

PROPERTY - Murray Brook property comprises Mining Licence 1180 (1,226 acres).

PRODUCTION - None

FINANCIAL - The property was optioned to Gowganda Silver Mines in 1973. Option called for expenditure of $1.2 million over four years, whereby Gowganda could acquire 60 per cent of Kennco Exploration Limited interest.

In 1974 Canex Placer (Placer Development Corp.) assumed Gowganda's obligations, with Gowganda retaining 25 per cent interest. Placer Development were to spend $600,000 in three years on Murray Brook and Restigouche deposits. Property reverted to Kennco Exploration Limited in 1979; apparently Gowganda Silver Mines retains its interest (24 per cent).

RESERVES -

Tons (x 10^3)	Cu	Pb	Zn	S	Fe	Ag	Au
	per cent					oz/ton	
23,000	0.44	0.86	1.95	34	34	0.91	0.01
	This figure can be divided as follows:						
4,314	0.16	2.08	5.55	38	34	2.08	0.016
1,312	0.87	0.30	1.18				
5,938	1.11	0.52	1.01				
12,293	0.26	0.65	1.22				

No figures are available on the secondary enriched copper zone that covers the deposit.

OUTLOOK - The drilling carried out by Placer has not appreciably altered Kennco's tonnage-grade picture. The results of their metallurgical tests are not known. It is unlikely that this deposit will be mined in the near future.

RESTIGOUCHE SULPHIDE DEPOSIT

LOCATION - Lat. 47°30.2'N; Long. 66°33.5'W

HISTORY AND DEVELOPMENT - Property initially staked by Selco in 1954 because of strong base metal anomalies in streams draining the area. The property was optioned to New Jersey Zinc Company in 1957 who discovered the sulphide deposit by drilling a strong soil geochemical anomaly. The new company, the Restigouche Mining Corporation (main New Jersey Zinc), optioned the property to Teck Corporation (Keevil Mining Group) in 1965. After several drill holes and metallurgical tests, Teck dropped their option in 1970. In 1972 the property was optioned to Gowganda Silver Mines who turned over their interests to Placer Development in 1974. Placer's interest in this deposit was assumed by Billiton in 1980.

COMPANY - Billiton Canada Ltd.; Head Office - 2802, 130 Adelaide Street West, Toronto, M5H 3P5. President - J.W.G. Gilbey; Gowganda Silver Mines, Suite 2500, 390 Bay Street, Toronto, M5H 2Y2. President - A. J. Anderson, Secretary-Treasurer - A. Camisso.

PROPERTY - Held as Mining Licence 1237 (6766.35 acres).

PRODUCTION - None

FINANCIAL - The details of the agreement between Restigouche Mining Corporation and Billiton Canada Limited are not known.

RESERVES

	Tons (x 10^3)	Cu	Pb	Zn	Ag
			per cent		oz/ton
	2619	0.34	5.5	6.8	3.0
or					
	3260		4.6	5.9	

A bulk concentrate prepared by Teck Corporation had the following composition:

19% Pb, 28% Zn, 1.2% Cu, 0.05% Cd, 9 oz/ton Ag, 0.02 oz/ton Au, 15% Fe, 0.04% As, 0.006% Sn

DEVELOPMENTS - Billiton must have earned their interest in this deposit from Placer Development, but have reported nothing of their work to date. An item in the Northern Miner last June reported two sulphide intersections in a drill hole at the north end of the Restigouche deposit. The first comprised 72 feet, 0.35% Cu, 6.19% Pb, 8.2% Zn and 2.6 oz/ton Ag. The second deeper intersection was 56.5 feet wide and assayed 0.35% Cu, 3.8% Pb, 6.9% Zn and 3.56 oz/ton Ag. It is not known if this drill hole increased the previously calculated tonnage.

OUTLOOK - This deposit probably could be mined profitably when metal prices improve, although its size is a handicap.

STRATMAT DEPOSIT

(Cominco Limited)

LOCATION - Main (East) Zone - Lat. 47°19'11"; Long. 66°06'31"
Central Zone - Lat. 47°18'42"; Long. 66°07'07"
West Zone - Lat. 47°18'31"; Long. 66°08'03"
Stringer Zone - Lat. 47°16'; Long. 66°08'25"

HISTORY AND DEVELOPMENT - The Stratmat deposits are located approximately 4 km (2.5 miles) northwest of Heath Steele, in Northumberland County. Access is via Highway 430. The Main or Stratmat (East) Zone was discovered by Strategic Metals in 1956 following geophysical surveys. Strategic drilled holes 61-1 to 61-36 in 1956-57, but optioned the property to Cominco Limited in 1959. Cominco exploration led to the discovery of the West Zone in 1961, and the Stringer and Central Zones in 1972. The West Zone lies on the boundary between the Heath Steele and Cominco properties (see reserves).

COMPANY - Cominco Limited; Executive Office - 200 Granville Square, Vancouver, V6C 2R2. Chairman - F. E. Burnett. Vice President, Eastern Region - J.R.M. Douglas.

PROPERTY - Two mining licences 1007 and 1008 (2,004 acres), adjoining Heath Steele mining lease.

PRODUCTION - None

FINANCIAL - Original discovery (Main Zone) was purchased from Stratmat in 1959 for $100,000 advanced royalties. Cominco purchased remaining royalty rights for $1,000 in 1970.

RESERVES - Cominco

	Tons	Cu	Pb	Zn	Ag
			per cent		oz/ton
Main Zone	700,000	0.03	1.8	5.2	1.9
	500,000	1.9			
Central Zone	200,000+	0.5	4.3	8.0	
Stringer Zone	200,000+	2.0			
West Zone Main	1,600,000		2.9	7.5	0.9
East Depth	400,000	0.7	2.6	12.2	0.7
Heath Steele West Zone (A) (N-2) (at depth)	600,000	0.5	3.6	9.6	2.3

CAPTAIN SULPHIDE DEPOSIT

LOCATION - The deposit occurs in Gloucester County, approximately 1000 feet north of the Heath Steele railway line, and about 9 miles east of Heath Steele (Lat. 47°17'03"; Long. 65°52'58").

HISTORY - Discovered in late 1956 by drilling (Captain Yellowknife Mines). Ground E.M. outlined the target area. Twenty-six drill holes put down in 1956-57, 2 in 1963, 13 in 1965 and 4 in 1971-72 (total 45). Acquired by Sabina Industries in 1977.

COMPANY - Sabina Industries Ltd., P. O. Box 428, Pembroke, Ontario K8A 6X6. President: W. W. Cummins. May be part of option deal with Metallgesellschaft Canada Ltd., and Aquitaine Co. Canada Ltd. (so-called South Bathurst Joint Venture).

PROPERTY - Mining Licence 834

RESERVES - Two estimates have been made as follows:

	Tons x 10^3	Cu %	Ag oz/ton	Au oz/ton	
or	215	1.99	0.28	0.017	(D. A. Williams, 1976, M.R.B.)
	343	1.99	0.28	0.017	(1974-75 Mines Handbook)

Indicated to a depth of 1200 feet.

OUTLOOK - This deposit will not be mined in the foreseeable future, unless substantial, additional, better grade tonnage is found. No new work has been reported by S.B.J.V., although a discovery of a small Zn-Pb-Ag deposit (Captain) (North) has been made northwest of the Captain deposit.

PATAPAT BROOK

LOCATION - Approximately 35 km (22 miles) northwest of Bathurst (Lat. 47°51'08"N; Long. 65°51'13"W).

HISTORY AND DEVELOPMENT - Original discovery made by J. Knowles in 1956. Other veins were discovered during subsequent exploration. Early work carried out by Dome Exploration Ltd., Columbia Placers Ltd., and Worldwide Explorations Ltd. (J. W. McCarthy). Worldwide apparently signed a contract with Brunswick Mining and Smelting (Smelter Division) to supply an unknown tonnage of "ore" in the mid-1970's. How much of this "ore" was supplied is unknown. Worldwide sold the property in 1981 to present owners Rodney Archibald and Frederick Arseneault who also have signed a smelter contract.

COMPANY - Two of the principals involved are Rodney Archibald, Canobie, N. B., and J. Frederick Arseneault, 815 Murray Avenue, Bathurst, N. B.

PROPERTY - Mining Licence 1323

PRODUCTION - None reported

RESERVES - According to a report by Alcott (1973) for Worldwide Explorations, the reserves to the bottom of the 40-foot shaft on the Knowles vein were:

Tons	Cu	Zn	Pb	Ag
2100	3.43%	7.45%	8.68%	15 oz/ton

True width is 51 cm (20.1 in.), length 200 feet (61 meters).

DEVELOPMENTS - Rod Archibald has hired a contractor to mine the ore.

PROBLEMS - The property has limited reserves and is a small one- or two-man operation only.

TURGEON (BELLEDUNE) DEPOSIT

LOCATION - Lat. 47°52.6'N; Long. 66°52.6'W - located near the new Highway No. 11, approximately 4 km from Belledune.

HISTORY AND DEVELOPMENT - Initial claims were staked in the 1952-55 "rush". C. A. Willett and J. W. McCarthy came into the picture in 1957 when they discovered a Zn-Cu showing (Esso's "Beaver Pond showing"). M. J. Boylen Ltd. optioned the property in 1958, followed by Noranda in 1959 and Rio Tinto in 1960. Various EM and magnetic surveys were carried out. Trenching and diamond drilling (2 holes by Noranda and 4 holes by Rio Tinto) revealed a small low-grade sulphide lense. McCarthy and Willett discovered an additional chalcocite showing in 1964 and optioned the claim group to Industrial Mineral Exploration Limited. Property converted to Mining Licence 1155 in 1967 and a new company was formed (Heron Mines Limited). VLF-EM, S.P., I.P., resistivity, magnetic, gravity and soil geochemical surveys have been carried out by Heron Mines. Ten diamond drill holes have been put down, but only the last three (77-1, 77-3, 77-4) intersected what appears to be the main massive sulphide deposit (Esso's "Power-line showing"). Property optioned to Esso Minerals Canada in 1978. They have drilled 23 holes up to February, 1981.

GEOLOGY - The two main sulphide showings (Power-line and Beaver Pond) occur in altered Fournier Group pillow basalt ("basalt-andesite") near a contact with highly altered felsic pyroclastic rocks (Keratophyric?), ("rhyolite-dacite" according to Esso). Esso reports the sulphides in the Power-line showing occur as lenticular pods and fracture fillings comprised of pyrite, chalcopyrite and sphalerite. The Beaver Pond showing appears to be a saucer-shaped mass consisting of 300-500 tonnes of pyrite, sphalerite and chalcopyrite.

COMPANY - Heron Mines Limited (Industrial Marine Limited, Suite 1906, 375 Park Avenue, New York, N. Y., U.S.A., 10022). Company Official - John Carroll. Original Owners - C. A. Willett and J. W. McCarthy, each thought to have 300,000 shares of Heron Mines.

PROPERTY - Mining Licence 1155 and sixty-two (62) surrounding claims owned by Heron Mines Limited and Joseph Porter (consultant) are now under option to Esso Minerals. These are in turn surrounded by about 178 claims staked by Esso Resources Limited and Imperial Oil Limited.

PRODUCTION - None

RESERVES - rough estimate based on drilling to date (February, 1981)

Tons	Zn%	Cu%
500,000	4.0	1.5

DEVELOPMENTS, 1981 - Work is continuing on this prospect owned by Heron Mines Limited. Over 60 drill holes put down by Esso Minerals in two showings (see property description) have outlined what appears to be a significant deposit of zinc and copper sulphides. No official news has been reported. A decision regarding the option agreement must be made by Esso in the fall of 1982.

TAYLOR BROOK OCCURRENCE

LOCATION - Lat. 47°21'28"; Long. 66°01'10"

HISTORY - Found in 1977 by Consolidated Morrison Explorations Ltd. on property optioned from John Duffy. Initial interest was aroused by an airborne E.M. anomaly (survey carried out by Consolidated Morrison Explorations Ltd.). So far, work has been carried out on four claims surrounding the airborne anomaly.

PROPERTY - Early 1980 converted to mining licence, comprising nine claims, in favour of John A. Duffy. Consolidated Morrison did not renew option.

WORK DONE, 1977 - Geological, magnetometer, MaxMin II E.M., and soil geochemical surveys were carried out. One drill was put down (total about $15,000). 1978 - Five drill holes put down, and several trenches excavated. No appreciable improvement in size or grade.

RESULTS - An E.M. conductor with a small coincident magnetic anomaly was outlined. Weak single sample base metal anomalies were found north of the conductor. Drilling revealed 14.1 feet of massive sulphides. Ten feet (76.5 to 86.5 feet) assayed 2.17% Zn, 0.30% Pb, 0.06% Cu, 0.53 oz/ton Ag, and 0.001 oz/ton Au.

GEOLOGY - Massive sulphides occur in chloritic to siliceous tuffs or volcanogenic sediments at the contact between quartz-feldspar metaporphyry (crystal tuff) and rhyolite tuff. The southerly dipping sequence is overturned.

OUTLOOK - Consolidated Morrison geophysicists believe the deposit to be small, probably in the vicinity of 250,000 tons. Ten drill holes are recommended to test the deposit along strike and down dip.

NASHWAAK COPPER-TUNGSTEN-SILVER

(Kidd Creek Mines)
Sisson Group

LOCATION - York County, approximately 18 miles north of Millville, N.B.

HISTORY - 1955 - Nashwaak Pulp and Paper had mineral rights

1959-60 - Exploration consisted of geophysics, geology, geochem., and diamond drilling

1969 - Penarroya drilled 4 holes and intersected short sections of W and Mo

COMPANY - Kidd Creek Mines Ltd. (wholly owned subsidiary of Canada Development Corporation): President - George Mannard; V.P. Exploration - Peter Money.

PROPERTY AND DEVELOPMENT - 1973 - Exploration by Texasgulf consisted of diamond drilling, geochem., geology, and geophysics. In 1979, 11 holes were drilled intersecting significant W, Cu with Fe, As, Zn and Bi in silicified dacite tuff and quartz veins and stockworks.

EMPLOYEES - None

PRODUCTION - None

FINANCIAL - 1977 - Total current assets $381,587,000; total current liabilities $131,764,000.

RESERVES AND GRADE - Not stated

DEVELOPMENTS, 1981 - Texasgulf Inc. carried out additional diamond drilling, geochemical and geophysical surveys on the property during the year. In early 1982, the property was transferred to the control of Kidd Creek Mines Ltd.

OUTLOOK - Continued exploration

TEAHAN COPPER-ZINC-LEAD

(Kidd Creek Mines Limited)
Albert County, New Brunswick

LOCATION - The Teahan base metal zone is situated near the junction of Barrett and Kierstead Brooks on the headwaters of Salmon River.

HISTORY - The earliest record of the Teahan prospect dates from 1881, when it was known as the Goodfellow Mine. The prospect has been intermittently explored from that time until 1972.

COMPANY (Ex. Off. - Pres., Mine Mgr., Etc.) - G. W. Mannard is vice president of exploration.

PROPERTY AND DEVELOPMENT - The mineralized zone has been explored by a limited amount of shallow drilling. The old shafts in the mineralized zone have mostly collapsed or are in an unsafe condition.

EMPLOYEES -

PRODUCTION POSSIBILITIES - The shallow drilling carried out in recent years intersected sulphides over a strike length of 3,000 feet. However, high grade ore was mined from deeper levels during the past.

FINANCIAL - During the past 10 years approximately $50,000 has been expended on the property by Mija Mines Ltd.

RESERVES AND GRADE - Available drill data are insufficient to make reliable tonnage calculations. The mineralized material intersected by recent shallow drilling graded about .2%-.5% Cu and 2%-3% Zn. However, reports of ore mined in the past stated grades of about 7% Zn, 15% Cu and 2% Pb.

DEVELOPMENTS, 1981 - No work was reported on the property in 1981.

OUTLOOK - The large low grade zone delineated near surface is presently not of economic interest. However, exploration at depth for higher grade material similar to that mined in the past merits consideration.

ADAMS ISLAND COPPER

Lorenzo Blondeau
Charlotte County, New Brunswick

LOCATION - This deposit is located on Adam's Island and extends from there under Passamaquoddy Bay.

HISTORY - High-grade copper sulphides were found on Adam's Island around 1898 and exploration has continued intermittently to the present time.

COMPANY (Ex. Off. - Pres., Mine Mgr., Etc.) - The property is held by Lorenzo Blondeau.

PROPERTY AND DEVELOPMENT - Some shallow drilling has been carried out on the island and two shafts provide access to part of the deposit.

EMPLOYEES -

PRODUCTION POSSIBILITIES - Some high-grade copper ore was intersected by diamond drilling. In order to determine the feasibility of mining the deposit, underground workings will have to be extended under Passamaquoddy Bay.

FINANCIAL - About $40,000 has been expended on diamond drilling and geophysical work.

RESERVES AND GRADE - Reserves can only be estimated after the extent of the deposit beneath Passamaquoddy Bay has been established. One drill hole intersected the following: 10' - 17% Cu, 7' - 2.65% Cu and 8' - 3.12% Cu.

DEVELOPMENTS, 1981 - Nothing was reported in 1981.

OUTLOOK - Delineation of the deposit will require extensive underground work below Passamaquoddy Bay. A drastic increase in the price of copper is a prerequisite to initiate this work.

WOODSTOCK COPPER

LOCATION - East side of Saint John River, approximately 4 miles south of town of Woodstock

HISTORY - 1954 - Stratmat explored property
1960 - Trans Nation " "
1965-67 - Phelps Dodge explored property extensively locating disseminated copper mineralization in float, assaying 0.40% copper

COMPANY (Ex. Off. - Pres., Mine Mgr., Etc.) -

PROPERTY AND DEVELOPMENT - 1969-71 - Falconbridge Nickel Mines Ltd. explored property utilizing geological, geophysical, geochemical and diamond drilling techniques, expending over $100,000

1971-74 - A. W. Lockhart acquired mineral rights. Exploration consisted of geological, geochemical and drilling, expending $62,500

1978 - Nil

EMPLOYEES - None

PRODUCTION - None

FINANCIAL -

RESERVES AND GRADE - (1974) average assay based on drilling results 0.25%

DEVELOPMENTS, 1981 - None

OUTLOOK - Will remain undeveloped until copper increases markedly in price

ANNIDALE COPPER

W. G. Walton and M. J. Grant
Kings County, New Brunswick

LOCATION - The Annidale copper deposit is about 1 mile south of Annidale, Kings County.

HISTORY - Copper sulphides were first found in the Annidale area around 1900. Between 1902 and 1922, several short shafts and pits were sunk in the deposit. American Metals Mining Company and New Brunswick Copper Corp. drilled part of the deposit between 1951 and 1955. Cities Service uncovered part of the deposit in 1969.

COMPANY - (Ex. Off. - Pres., Mine Mgr., Etc.) - The property is presently held by J. J. Grant and W. G. Walton.

PROPERTY AND DEVELOPMENT- About 6,800 feet of drilling was carried out and three small shafts provide access to part of the deposit.

EMPLOYEES -

PRODUCTION POSSIBILITIES - Around 1920, two carloads of high-grade copper ore were sold from the mine. Present drill-indicated ore is probably insufficient to support a mining operation, but the drilling was inadequate to determine the limits of the deposit.

FINANCIAL - It is difficult to estimate the amount of money expended on exploration, but it was probably in the order of $100,000.

RESERVES AND GRADE - Drill-indicated reserves are about 100,000 tons grading between 2% and 7% copper. This tonnage may be increased when the limits of the deposit are determined with additional drilling.

DEVELOPMENTS, 1981 - No work was reported on the property in 1981.

OUTLOOK - It is possible that further drilling may prove up more ore. The presence of this high-grade deposit intermittently activates exploration activity in the Annidale area when the price of copper is favourable.

DORCHESTER COPPER-URANIUM

(Siscoe Metals of Ontario)

LOCATION - The Dorchester copper-uranium deposit occurs about two miles northeast of Dorchester, Westmorland County.

HISTORY - The first occurrence of chalcocite was found in the area around 1870. An extensive, but widely-spaced diamond drilling program, was carried out jointly by Canerpa, Amax and Gulf Exploration between 1972 and 1979.

COMPANY (Ex. Off. - Pres., Mine Mgr., Etc.) - S. Kapura is president of Siscoe Metals of Ontario.

PROPERTY AND DEVELOPMENT - The property has been explored by diamond drilling on a widely-spaced grid. One old adit still provides access to part of the ore zone. Gulf Minerals Canada Ltd. conducted an extensive diamond drilling program in the Dorchester area during 1978. The grade of the mineralized zone is, however, too low for a mining operation at this time.

EMPLOYEES -

PRODUCTION POSSIBILITIES - A small amount of copper was produced between 1900 and 1903, but there has been no production in recent years.

FINANCIAL - Amax, Canerpa and Gulf have spent approximately $300,000 on the property in recent years.

RESERVES AND GRADE - Ore grade material constitutes part of a large low-grade copper zone. The summary report by Canerpa and Amax estimated a possible 2-3 million tons, grading 2% copper, but the deposit could well be much larger.

DEVELOPMENTS, 1981 - No work was reported in 1981.

OUTLOOK - The possibility of a major copper deposit exists in the Dorchester area and will probably lead to further exploration. Geologic mapping by the Mineral Resources Branch has delineated a favourable zone for mineral exploration in this area, but most of this ground has not been explored to date.

EVANDALE COPPER-MOLYBDENUM

(Dome Exploration (Canada) Ltd.)
Kings and Queens Counties, New Brunswick

LOCATION - The Evandale copper-molybdenun zone is located about two miles west of the village of Evandale.

HISTORY - The mineralized zone was discovered in 1967 as a result of geochemical stream sediment sampling.

COMPANY - (Ex. Off. - Pres., Mine Mgr., Etc.) - M. A. Taschereau is president of Dome Exploration (Canada) Limited.

PROPERTY AND DEVELOPMENT - A limited amount of soil geochemistry, geophysics and diamond drilling was carried out by Rio Tinto Exploration. Dome Exploration has conducted a limited drilling program on the property.

EMPLOYEES -

PRODUCTION POSSIBILITIES - This large low-grade copper-molybdenum zone has received only minor exploration, but further work could well delineate an economic deposit.

FINANCIAL - Various companies have spent about $80,000 on the property.

RESERVES AND GRADE - The copper and molybdenum sulphides occur disseminated and along fractures in a broad zone about 1,000 feet wide and 8,000 feet long. Estimation of tonnage and grade will require an extensive exploration program.

DEVELOPMENTS, 1981 - The results of work carried out during 1981 were not reported at the time of writing this report.

OUTLOOK - The property has potential as a porphyry-type copper-molybdenum deposit. Deposits of this type are usually mined as large open pit operations.

GOSHEN COPPER

A. W. Lockhart

LOCATION - The Goshen copper deposit is situated one mile southwest of Goshen, Albert County.

HISTORY - The deposit was found in 1925 and it has been worked intermittently since that time. Oakwood Mines Ltd. trenched and sampled the deposit extensively between 1955 and 1956.

COMPANY (Ex. Off. - Pres., Mine Mgr., Etc.) - The property is presently held by A. W. Lockhart.

PROPERTY AND DEVELOPMENT - The zone is fully delineated by trenching and diamond drilling.

EMPLOYEES - - A. W. Lockhart works the property intermittently with the objective of developing a small-scale mining operation.

PRODUCTION POSSIBILITIES - It may be possible to develop a small-scale inexpensive open cast mining operation.

RESERVES AND GRADE - Reserves are estimated at 25,000 tons grading 2.35% copper.

DEVELOPMENTS, 1981 - No developments were reported in 1981.

OUTLOOK - The deposit may support a small open cast mining operation when the price of copper becomes attractive. The presence of this deposit has also stimulated exploration for larger deposits of this type in the area.

MIDWAY COPPER

(Gulf Minerals Canada Ltd.)

LOCATION - The Midway copper prospect is situated just southwest of Midway Settlement along the Midway Road, east of Germantown, Albert County, New Brunswick.

HISTORY - Copper minerals were first discovered here around 1900. A short shaft and numerous pits were sunk by the discoverers at that time. In 1941, a limited amount of diamond drilling was carried out by the New Brunswick Department of Lands and Mines. The property was subsequently explored by MacFee Explorations Ltd. (1953), Maritime Explorations (1963), Noranda Exploration Ltd. (1964). In 1976, the ground was staked by Gulf Minerals Canada Ltd.

PROPERTY AND DEVELOPMENT - The mineralized zone is known to extend at least 8,000 feet, but could be much larger. Exploration until the recent work by Gulf Minerals Canada Ltd. has been erratic.

EMPLOYEES -

PRODUCTION POSSIBILITIES - Preliminary exploration results of Gulf Minerals Canada Ltd. indicate the possibility of a large tonnage, low grade copper operation.

FINANCIAL -

RESERVES AND GRADE - A systematic investigation is required before any reliable estimates of reserves and grades can be made.

DEVELOPMENTS, 1981 - No work was done on the property in 1981.

OUTLOOK - Systematic exploration of the favourable contact zone may lead to the delineation of a large tonnage, low grade deposit, that can be mined at low cost. It is notable that the favourable contact zone has not been explored in the down dip direction and only sporadically along strike.

NEW HORTON COPPER-URANIUM

LOCATION - The mineralized zone surrounds the settlements of New Horton and Upper New Horton, Albert County, New Brunswick.

HISTORY - Copper minerals were discovered here in 1980. Lake George Mines sunk a shaft to 120 feet in 1928 and developed two short drifts at the 50 and 100 foot levels. In 1947, the New Brunswick Department of Lands and Mines drilled three short surface holes and proved mineralization along a fault for a strike length of 800 feet. A limited amount of geophysical work and drilling was carried out subsequently by Pacific Explorations in 1953 and Anaconda in 1964. The results were not encouraging.

PROPERTY AND DEVELOPMENT - Gulf Minerals conducted a systematic soil geochemical and radiometric survey along the mineralized fault zone. A copper-uranium anomaly of possible economic significance was found in the southwest end of the property.

EMPLOYEES -

PRODUCTION POSSIBILITIES - No economic deposit has been delineated in this area to date.

DEVELOPMENTS, 1981 - Gulf Minerals allowed the claims to expire.

OUTLOOK - Present exploration results in this fault-controlled mineralized zone appear less favourable than at the Midway property.

NEREPIS ZINC-LEAD-COPPER-TIN

J. J. Dolan

LOCATION - The deposit is situated west of Nerepis, on Highway 2A, south of Welsford, Saint John County, New Brunswick.

HISTORY- Base metal sulphides were first found in the area around 1864. A narrow high grade vein found by a local prospector in 1954 was drilled by Fundy Bay Copper Ltd. In 1959, the property was staked by Crystal Ice Ltd. and optioned in subsequent years by Rio Tinto, Frank Joubin and Associates and Merrill Obalski Ltd. Merrill Obalski first discovered tin on the property.

COMPANY (Ex. Off. - Pres., Mine Mgr., Etc.) - The property is presently held by J. J. Dolan.

PROPERTY AND DEVELOPMENT - Diamond drilling and ground geophysical surveys were carried out in several selected areas.

EMPLOYEES -

PRODUCTION POSSIBILITIES - This is one of the better base metal-tin prospects in southern New Brunswick.

FINANCIAL - Various exploration programs conducted on the property since 1956 probably amount to about $120,000.

RESERVES AND GRADE - Diamond drilling in 1969 intersected about 8.0 feet grading 8.5% zinc, but available drilling data is insufficient to make a tonnage estimate at the present time. Tin minerals (up to 0.7% Sn) accompanied by base metal sulphides occur in metasedimentary rocks along the contact of lower Carboniferous granite.

DEVELOPMENTS, 1981 - MEX Explorations carried out some prospecting and sampling in the western part of the property, which has the greatest potential for tin and tungsten minerals.

ST. STEPHEN NICKEL

Atlantic Nickel Mines Ltd.
(Preussag Canada Ltd.)

LOCATION - The two main nickel-copper orebodies are situated about one mile north of St. Stephen, Charlotte County, New Brunswick.

HISTORY - The first nickel-copper sulphide showings were found in the St. Stephen area around 1870 and the area has been intermittently explored since that time. The most extensive development occurred between 1958 and 1960.

COMPANY (Ex. Off. - Pres., Mine Mgr., Etc.) -The company president is T. E. Jensfelt.

PROPERTY AND DEVELOPMENT - The property has been intensively drilled and a shaft provides access to the 150 and 250 foot levels of the main orebody.

EMPLOYEES -

PRODUCTION POSSIBILITIES - There has been no production from the mine, because ore treatment by conventional methods would result in a loss of about 40% of the nickel. Development of a suitable hydrometallurgical technique would probably make it possible to treat the ore.

FINANCIAL - Between 1971 and 1973 the company expended $225,545 on diamond drilling and metallurgical testing.

RESERVES AND GRADE - The main (Rodgers Farm) orebody contains 380,000 tons grading 1.05% Ni and .46% Cu proven ore, 84,000 tons grading .61% Ni and .34% Cu indicated ore, and 153,000 tons grading 1.05% Ni and .46% Cu inferred ore.

DEVELOPMENTS, 1981 - No work was done on the property during 1981. Extensive diamond drilling was carried out during previous years and a three-compartment shaft gives access to the main orebody.

OUTLOOK - It is possible that a hydrometallurgical process could be applied to treat the St. Stephen ores. Additional ore would have to be discovered, however, to make this an economic possibility.

TRUE HILL TIN-BASE METAL

(St. Joe Canada Inc.)

LOCATION - The True Hill property is situated about 2 miles west of Mount Pleasant, Charlotte County, New Brunswick.

HISTORY - The first tin-zinc showing was discovered on the property in 1962. No further work was done until it was restaked in 1978 by Beth-Canada Limited.

COMPANY (Ex. Off. - Pres., Mine Mgr., Etc.) - John F. Stephenson, Senior Geologist

PROPERTY AND DEVELOPMENT - Two holes were drilled in the northern part of the property in 1962 intersecting tin and zinc minerals of economic interest. Detailed surface investigation by Beth-Canada led to the discovery of a tin-bearing breccia on the property. The company drilled a few holes in 1980, but the results were not made public.

PRODUCTION POSSIBILITIES - The discovery of tin-bearing breccia on the property may lead to the discovery of a tin ore deposit.

FINANCIAL - About $200,000 has been spent on exploration of the property over the years.

RESERVES AND GRADE - Further exploration is required to delineate an economic ore deposit.

DEVELOPMENTS, 1981 - St. Joe Canada Inc. purchased the claims from Beth-Canada Ltd. No results of work carried out were announced.

OUTLOOK - Present geologic evidence indicates that the property has considerable potential for an economic tin deposit. This is particularly interesting because the property is close to Mount Pleasant and the ore could be treated in the Mount Pleasant mill.

DEER LAKE TUNGSTEN

(Shell Canada Resources Ltd.)

LOCATION - Tungsten-bearing quartz veins occur in the Deer Lake area, four miles southeast of Mount Pleasant, Charlotte County.

HISTORY - Tungsten, tin and base metal sulphides were first found in this general area in the course of a geologic mapping program conducted by the Mineral Resources Branch (Sussex Regional Office) in 1975. Follow-up of this mapping program by MEX Exploration in 1980 led to the discovery of numerous tungsten-bearing quartz and greisen veins similar to those found in the Burnt Hill area in central New Brunswick. MEX Exploration transferred the property to Shell Resources Ltd.

COMPANY - (Ex. Off. - Pres., Mine Mgr., Etc.) - The property is held by Shell Canada Resources Ltd. Dr. B. Baldwin is exploration manager of the company.

EMPLOYEES - The company employed a drill crew during part of the summer.

PRODUCTION POSSIBILITIES - More exploration is required to delineate a possible economic deposit.

FINANCIAL - Expenditures were not reported at the time of writing this report

RESERVES AND GRADE - Reserves and average grade of this zone are not known at this time.

OUTLOOK - This mineralized zone resembles the Burnt Hill tungsten deposit in central New Brunswick and has similar potential.

VICTORIA-MISTAKE LAKE AREA

(Shell Canada Resources Ltd.)

LOCATION - This tin-bearing mineralized zone is situated about 11 miles southeast of Mount Pleasant, Charlotte County, New Brunswick.

HISTORY - Greisen veins and sulphide-bearing rocks were first found in the area in the course of a geologic mapping program conducted by the Mineral Resources Branch (Sussex Regional Office) in 1975. Follow-up of this mapping program by MEX Exploration led to the delineation of a tin-bearing greisen zone in 1980. MEX Exploration then transferred the property to Shell Canada Resources Ltd.

COMPANY (Ex. Off. - Pres., Mine Mgr., Etc.) - The property is held by Shell Canada Resources Ltd. B. Baldwin is exploration manager of the company.

EMPLOYEES - The company employed a geologist and sampling crew on the property during the summer.

PRODUCTION POSSIBILITIES - The property has considerable mineral potential, but an extensive diamond drilling program is required to delineate a possible economic ore zone.

FINANCIAL - Shell Canada Resources has expended about $190,000 on the property.

RESERVES AND GRADE - Reserves and average grade of this mineralized zone are not known at this time.

DEVELOPMENTS, 1981 - An extensive till sampling program and detailed geologic mapping were carried out.

OUTLOOK - The prospect resembles the tin-tungsten deposit found by Shell Resources Ltd. in the South Mountain Batholith, near Yarmouth, N.S. The possibility for an economic ore deposit is quite good.

SHIN CREEK MOLYBDENUM-TUNGSTEN-URANIUM

H. C. McNamara

LOCATION - The Shin Creek prospect is situated about 6 km west of West Mill Settlement, Sunbury County, New Brunswick.

HISTORY - Mr. Harold McNamara found uraniferous showings in this area during 1974. The zone was subsequently mapped in detail by the Mineral Resources Branch, and in part drilled by Rio Tinto Canadian Exploration Ltd. and Rayrock Mines Ltd. Subsequent drilling in the western part of the property led to the discovery of molybdenite and wolframite.

COMPANY - (Ex. Off. - Pres., Mine Mgr., Etc.) - The property is held by H. C. McNamara.

PROPERTY AND DEVELOPMENT - Reconnaissance diamond drilling and radiometric surveys of the property have been carried out by Rio Tinto Canadian Exploration Ltd., H. C. McNamara and Rayrock Mines Ltd. The initial geological and radiometric survey was conducted by the Mineral Resources Branch. Only the molybdenum - tungsten bearing zone, in the western part of the property was retained by Mr. McNamara.

EMPLOYEES -

PRODUCTION POSSIBILITIES - The molybdenite- and wolframite-bearing silicified breccia discovered in the western part of the property is similar to the mineralized breccia in the Mount Pleasant ore zones. The possibilities for an economic ore deposit in this area are therefore excellent.

FINANCIAL - About $300,000 has been expended on the property by Rio Tinto, H. C.McNamara, Rayrock Mines Ltd. and Billiton Canada Ltd.

RESERVES AND GRADE - Unknown at this time.

DEVELOPMENTS, 1981 - Billiton Canada Ltd. optioned the property and conducted a limited diamond drilling program. Mineralized breccias that were intersected in these drill holes confirmed the presence of a subvolcanic complex similar to Mount Pleasant.

OUTLOOK - The presence of molybdenum and tungsten minerals found in rocks similar to those at Mount Pleasant makes this an excellent prospect.

BLIND LAKE TIN

(Shell Canada Resources Ltd.)

LOCATION - A prominent outcrop of tin-bearing, highly altered volcanic breccia was found by MEX Exploration, three miles northeast of Mount Pleasant, Charlotte County, New Brunswick.

HISTORY - MEX Exploration found this showing in the course of a regional exploration program conducted during the spring of 1980. MEX transferred the property to Shell Canada Resources Ltd. in 1981.

COMPANY (Ex. Off. - Pres., Mine Mgr., Etc.) - The property is held by Shell Canada Resources Ltd. Dr. B. Baldwin is exploration manager.

EMPLOYEES - The company employed a geologist and several prospectors in the St. George Batholith and surrounding area during 1981.

PRODUCTION POSSIBILITIES - This tin-bearing altered breccia greatly resembles a similar breccia immediately above the tungsten-molybdenum ore zone in the Fire Tower area of Mount Pleasant. The possibility for a Mount Pleasant-type deposit in the Mud Lake area is therefore excellent.

FINANCIAL - Exploration expenditures incurred on this property during 1981 were not reported at the time of writing of this report.

RESERVES AND GRADE - Reserves and grade are not known at this time.

DEVELOPMENTS, 1981 - Results of work carried out during 1981 were not made public at the time of writing this report.

OUTLOOK - The possibilities for a Mount Pleasant-type deposit in this area are excellent.

PLEASANT RIDGE TIN

(MEX Exploration Ltd.)

LOCATION - This occurrence is situated immediately southeast of a granite pluton that underlies the community of Pleasant Ridge in northern Charlotte County, New Brunswick.

HISTORY - Tin-bearing soil anomalies were found in the vicinity of the Pleasant Ridge pluton around 1960, but the bedrock source was not discovered at that time. During 1981, detailed prospecting by MEX Exploration in the vicinity of a major fault zone led to the discovery of this prominent occurrence.

COMPANY (Ex. Off. - Pres., Mine Mgr., Etc.) - A. Hudgins of Truro, Nova Scotia is exploration manager of MEX.

PROPERTY AND DEVELOPMENT - The overburden above the mineralized vein has been cleared in one locality. More work is planned in 1982.

EMPLOYEES - The company employed a geologist and several prospectors in this general area during the summer.

PRODUCTION POSSIBILITIES - This is a prominent tin occurrence that may well reflect an economic deposit. Extensive diamond drilling is required, however, to fully delineate the deposit.

FINANCIAL - Exploration expenditures incurred on this property during 1981 were not reported at the time of writing of this report.

RESERVES AND GRADE - Drilling is required to establish the tonnage and average grade.

DEVELOPMENTS, 1981 - Results of work carried out during 1981 were not reported at the time of writing of this report.

OUTLOOK - This is a promising tin prospect.

BURNT HILL TUNGSTEN

LOCATION - The Burnt Hill tungsten deposit is located one-quarter mile south of the mouth of Burnt Hill Brook on Southwest Miramichi River.

HISTORY - Molydenite was first recognized in veins near the mouth of Burnt Hill Brook in 1968. Mineral rights were assigned to Acadia Tungsten Mines Ltd. in 1912. Some underground work was done and concentrates were shipped. In 1941 Consolidated Mining and Smelting Company of Canada Limited did limited exploration work. The property was under the control of Burnt Hill Tungsten and Metallurgical Ltd.; Quebec charter (cancelled January, 1974; revived July, 1974) in the 1950's and subsequently.

COMPANY - Miramichi Lumber Company Limited

PROPERTY AND DEVELOPMENT - Burnt Hill Tungsten Mines Limited erected a 150-ton mill in 1954. Their mining licence was cancelled in 1959. In 1954 Miramichi Lumber Co. transferred all company's interest in mineral rights in York County to Crown (O.I.C. 55-29). In 1963, the Crown under O.I.C. 63-395 reconveyed to Miramichi Lumber Co. all mineral rights dealing with O.I.C. 55-29. In 1963 Burnt Hill Tungsten entered into an agreement with Miramichi Lumber Co. Diamond drilling exploration was carried out from 1963-64. A 232-foot shaft was sunk in 1968 and work was suspended in 1970. In 1979 Miramichi Lumber Co. carried out about 1,500 feet of underground exploration work and in March, 1979, shipped 100 tons of ore for metallurgical testing. Shaft dewatering and rehabilitation, underground surveying, drifting, tailings dam rehabilitation, site preparation and surface plant installations were undertaken. In 1980 color separation tests were carried out.

PRODUCTION - In 1916, 200 tons of ore was milled yielding 2,940 pounds tungsten concentrate. In 1917 to 1918, 13.5 tons of concentrate valued at $11,700 was shipped. In 1955, 50,128 pounds of concentrate was produced. In 1957, 15 tons of concentrates was shipped.

RESERVES AND GRADE - From 1963-65 an exploration program was carried out. An estimated 1.5 million tons of ore grading 0.75 to 1.0% WO_3 is present.

DEVELOPMENTS, 1981 - Canadian International Paper, parent company of Miramichi Lumber Company, was purchased by Canadian Pacific Enterprises on October 1, 1981.

OUTLOOK - Cominco, a subsidiary of Canadian Pacific Enterprises, is presently evaluating Miramichi's preliminary feasibility study to determine if they are interested in acquiring the property. If they decide in the negative, Miramichi will continue to evaluate the deposit.

HAMPTON-CORNHILL URANIUM

(Canadian Nickel Company)

LOCATION - The uraniferous belt (Upper Albert Formation), under exploration by Canadian Nickel since 1975, extends from the Hampton area northeast to Cornhill, Kings County, New Brunswick.

HISTORY - The first radioactive minerals were found in the Hampton area around 1953. A geochemical investigation during 1968 indicated the presence of uranium around Cornhill.

COMPANY (Ex. Off. - Pres., Mine Mgr., Etc.) - J. E. Corker is president of Canadian Nickel. A. T. MacGibbon, the Maritime District Geologist, is in charge of exploration of the property.

PROPERTY AND DEVELOPMENT - Extensive airborne and ground geophysical surveys, a geochemical investigation, and some diamond drilling have been carried out since 1975.

EMPLOYEES - The company employs 15-20 men throughout the field season on the properties.

PRODUCTION POSSIBILITIES - Uranium minerals of economic interest have been intersected by diamond drilling, but no economic ore deposit has been delineated.

FINANCIAL - The company has expended about $725,000 in the area since 1975.

RESERVES AND GRADE - Early diamond drilling results yielded several sections grading .071% - .064% U_3O_8 over lengths of one foot. One drill hole in the Hampton area intersected 8 feet grading about .05% U_3O_8. Assay results submitted from subsequent drilling were not encouraging.

DEVELOPMENTS, 1981 - None

OUTLOOK - The large uranium-bearing zone in the upper part of the Albert Formation is now well defined but the grades are erratic.

JORDAN MOUNTAIN URANIUM

(Shell Canada Resources Ltd.)

LOCATION - This group of claims is situated in the northeastern part of the Hampton-Cornhill Uraniferous Zone, Kings County, New Brunswick. Shell Canada Resources Ltd. has restaked this ground.

HISTORY - Copper was discovered at Jordan Mountain about 1900 and uranium was first reported in 1968. Canadian Nickel explored this ground extensively in subsequent years, but eventually allowed the claims to lapse.

COMPANY (Ex. Off. - Pres., Mine Mgr., Etc.) - C. W. Daniel is president and chief executive officer.

PROPERTY AND DEVELOPMENT - Extensive airborne and ground geophysical surveys, a geochemical investigation, and some diamond drilling were carried out when the ground was held by Canadian Nickel, but no orebody was developed.

EMPLOYEES -

PRODUCTION POSSIBILITIES - Copper and uranium occurrences were found on this ground, but extensive exploration will have to be carried out to determine if a mineable deposit is present.

FINANCIAL - The amount of money expended by Shell has not yet been reported. Canadian Nickel expended about $725,000 throughout the entire Hampton-Cornhill uraniferous zone.

RESERVES AND GRADE - These are unknown without extensive exploration

DEVELOPMENTS 1981 - At the time of writing of this report, the work carried out by Shell on the property had not been reported.

OUTLOOK - Uranium grades generally appear to be erratic in this area. There is, however, a possibility for red bed copper deposits in the vicinity of Jordan Mountain.

LOWER MILLSTREAM URANIUM

(Gulf Minerals Canada Ltd.)

LOCATION - The deposit is situated near the village of Lower Millstream, Kings County, New Brunswick.

HISTORY - A low grade uranium occurrence was found in a core drilled by the Canadian Nickel Company about five years ago. This ground was subsequently restaked by Gulf Minerals Canada Ltd.

COMPANY (Ex. Off. - Pres., Mine Mgr., Etc.) - The property is held by Gulf Minerals Canada Ltd. R. N. Taylor is president of the company and F. C. Perry is vice president of exploration.

PROPERTY AND DEVELOPMENT -

EMPLOYEES -

PRODUCTION POSSIBILITIES -

FINANCIAL -

RESERVES AND GRADE -

DEVELOPMENTS, 1981 - The company conducted a detailed sedimentological study of the surface geology and drill cores but no deposit of economic interest was delineated.

OUTLOOK - It has not been possible to trace the mineralization beyond the original discovery holes.

YORK MILLS URANIUM

(Seru Nucleaire Ltd.)

LOCATION - Seru Nucleaire Ltd. holds a claim group in the York Mills area, York County, New Brunswick.

HISTORY - Radioactive minerals were first found in the York Mills area during 1954; several low grade and a few short high grade sections were cut by diamond drilling in 1956.

COMPANY (Ex. Off. - Pres., Mine Mgr., Etc.) - M. Picquer (Paris, France) is chairman; A. Jaunatie, general manager.

PROPERTY AND EVELOPMENT - Four short holes were drilled by Uranium Mining and Metals Ltd. in the York Mills area during 1956.

EMPLOYEES -

PRODUCTION POSSIBILITIES - Interesting uranium occurrences have been found in this area, but no economic deposit has been delineated.

FINANCIAL -

DEVELOPMENTS, 1981 - No developments reported in 1981.

OUTLOOK - The geologic environment of this prospect is favourable for the discovery of an economic uranium deposit, but this will require an extensive exploration program. It is also notable that uranium occurrences are commonly associated with tin-tungsten-molybdenum deposits in this geologic environment.

CHAPTER 4. ENERGY RESOURCES AND PEAT

Coal, oil and natural gas were produced in New Brunswick as energy resources at approximately the same level as in previous years. Peat for horticultural purposes has shown an increase in production and interest by companies wishing to enter the business.

The value of energy resources produced in New Brunswick in 1981 was approximately $33,580,000 including peat moss.

OIL

Irving Oil Ltd. continued to produce oil from the Stoney Creek field with a total production of 2,020 barrels in 1981.

The original reservoir characteristics indicated an in place reserve of 17.7 million barrels with an indicated 2.6 million barrels recoverable. To the end of 1980 some 782,184 barrels have been produced, thus suggesting that 1.8 million barrels remain to be recovered.

The production history for Stoney Creek is as follows:

Date	Production (barrels)
1907-1973	741,001
1974	7,944
1975	7,166
1976	5,443
1977	5,146
1978	5,093
1979	4,570
1980	3,800
1981	2,020

There are two restrictions on production: antiquated equipment and lack of market.

NATURAL GAS

Moncton Utility Gas Limited continues to produce natural gas at Stoney Creek and are supplying some 535 customers at present.

The original recoverable reserves calculated for the field were 27 billion cubic feet (bcf), and 27.9 bcf have been produced to date. Thus either the initial recovery factor utilized was incorrect or there was more gas in place than calculated.

The production history for the field is as follows:

Date	Production (MCF)
1909-1973	27,487,153
1974	89,061
1975	90,774
1976	100,345
1977	85,639
1978	92,565
1979	97,471
1980	79,388
1981	71,936

COAL

N. B. Coal Limited, in the Minto-Chipman area, remained the sole producer of coal in 1980 with a production of some 587,726 tons. The sole market for the coal was N. B. Power (Tables 18 and 19, Figure 20).

URANIUM

Activity in the exploration for uranium decreased substantially with only a few companies maintaining claims.

At present there has been encouragement but no significant finds to date. It is anticipated that exploration for uranium will continue in the future on this reduced scale.

PEAT

Thirteen companies, mainly based in the northeastern area of New Brunswick, produced 3,500,000 bales (six cubic foot) in 1981. The main market was in the eastern seaboard of the United States, Quebec and Ontario. An increase in the marketability of peat moss has resulted in applications by 17 companies or individuals to develop peat moss production. The 13 producing companies are listed below.

ACADIAN PEAT MOSS CO. LTD. (Lameque, N. B.)

ATKINS & DURBROW (P. O. Box 88, Lower Caraquet, N. B.)

FAFARD PEAT MOSS COMPANY LIMITED (P. O. Box 70, Shippagan, N. B.)

GRANDE ANSE PEAT MOSS COMPANY LIMITED (Grande Anse, N. B.)

HEVECO LIMITED (P. O. Box 30, Tabusintac, N. B.)

LAMEQUE PEAT MOSS LIMITED (Lameque, N. B.)

PORTAGE RIVER PEAT MOSS COMPANY LIMITED (Portage River, North. Co., N. B.)

THERIAULT AND HACHEY LIMITED (Eel River Bridge, Parish of Hardwick, N. B.)

WESTERN PEAT MOSS COMPANY LIMITED (Maisonnette, N. B.)

ATLANTIC PEAT MOSS COMPANY LIMITED (Lameque, N. B.)

A.S.B. (CANADA) LTD. (Pointe Sapin, N. B.)

LA TOURBE PIGEON HILL LTD. (Lameque, N. B.)

LA TOURBIERE SAINT RAPHAEL (Lameque, N. B.)

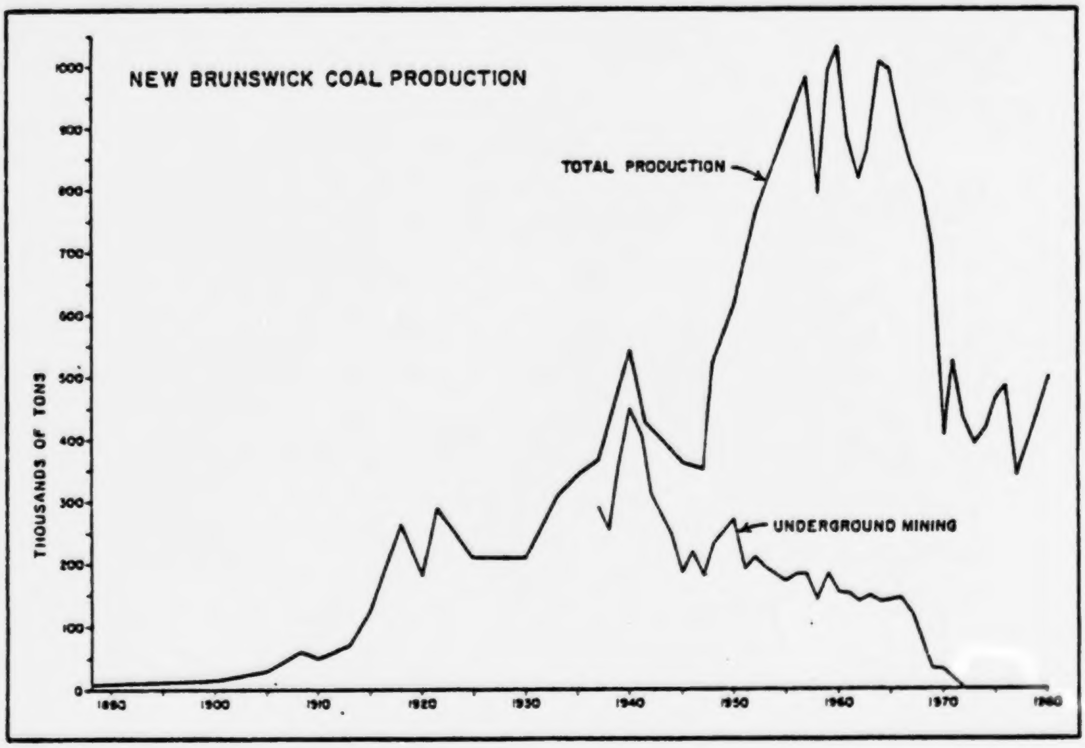


Figure 20. New Brunswick coal production

CHAPTER 5. INDUSTRIAL MINERALS

PROPERTIES RECENTLY EXPLORED AND/OR UNDER DEVELOPMENT

LIMESTONE

ALWARD (McGEE) LIMESTONE (21 I/3W) This limestone property is located approximately 2 km northeast of the Village of Havelock, Kings County. The area was initially investigated in 1965 and more recently has been extensively explored by Havelock Lime Works Ltd. involving a program of 14 diamond drill holes in 1976. Drilling to date has delineated at least 15 million tonnes of quarriable, high-calcium limestone. Although the geology and economics are favourable for the establishment of a quarry, mineral ownership is held by Canada Cement LaFarge Ltd., which has to date precluded the extraction of high calcic limestone for lime and quicklime production.

SAMPHILL LIMESTONE (21 H/14W) The Samphill limestone property is located about 5 km southwest of Havelock and is the site of an extensive quarry, operated by Havelock Lime Works Ltd. This quarry is estimated to contain in excess of 1.5 million tonnes of 97% $CaCO_3$ and has been in full operation since 1969. The company currently produces over 200,000 tonnes annually from this quarry and is expected to have 5 more years of production assured from known reserves.

HAVELOCK LIMESTONE (21 I/3W) A large limestone quarry is operated 4 km east of Havelock by Canada Cement LaFarge Ltd. This property has supplied raw materials to the nearby cement plant since 1952. Present reserve and grade estimates are apparently sufficient to sustain 10 to 20 years of operation. In addition, the company currently holds large areas of potential cement-grade stone in the immediate vicinity.

SPRINGHILL LIMESTONE (21 I/3W) Eight diamond drill holes drilled by Canada Cement LaFarge Ltd. in 1965 indicated reserves of approximately 25 million short tonnes with 9 million short tonnes of limestone containing greater than 95% $CaCO_3$. An additional 12 holes drilled by Canada Cement LaFarge Ltd. in 1981 have indicated that reserves may be somewhat lower than the 25 million short tonnes originally calculated.

PARLEE BROOK LIMESTONE (21 H/11W) The Parlee Brook limestone occurrences are situated approximately 12 km southwest of Sussex Corner on the banks of Parlee Brook. These limestones were investigated by Havelock Lime Works in 1975. Due to poor accessibility, small tonnages available, variable grades and quarry development problems, two areas were considered unsuitable for development in the near future. A third area investigated is thought to contain approximately 250,000 to 300,000 tonnes of high-calcium limestone, overlain by relatively thin thicknesses of overburden. These results are based on the completion of three drill holes and an extensive mapping program. Additional drilling is required to confirm the extent of these reserves.

GLEBE MINE LIMESTONE (21 H/11) This limestone property, located 8 km southwest of Sussex Corner, forms a prominent knoll east of Poley Mountain. Extensive sampling and a drilling program consisting of 2 cored drill holes and several blast holes carried out by Havelock Lime Works Ltd. in 1976 have indicated reserves of marginal quality limestone occurring in excess of 6 million tonnes. No further developments have been reported to date.

LORNEVILLE DOLOMITE (21 G/1E) This property is situated about 8 km southwest of Saint John near Lorneville Harbour. In 1973, the dolomite occurrence was mapped in detail and 34 holes were drilled by Great Horn Mining Syndicate. Approximately 8 million tonnes grading 20.8% Mg have been delineated. Such material is considered suitable for magnesium production, however negotiations to option the deposit have not been successful due to marketing problems.

KETEPEC LIMESTONE (21 G/8E) The Ketepec limestone property is located near the western perimeter of the City of Saint John between the Village of Ketepec and Menzies Lake. Mining claims covering the area have been held by Moosehead Breweries Ltd. (Ketepec Investments) since 1974. In 1974 and 1975, a mapping, sampling and drilling program (23 holes for a total of 2628 m) was conducted and indicated in the order of 56 million tonnes of limestone reserves ranging from 43.0 to 54.0% CaO, a grade suitable for cement. To date, negotiations to option the Ketepec deposit have not been successful due to unfavourable market conditions.

ELLIOT ROAD DOLOMITE (21 H/5E) This dolomite occurrence is situated in Kings County, about 22 km northeast of Saint John, near Model Farm and French Village. Mining claims to part of the area are currently held by Great Horn Mining Syndicate.

In 1967, a preliminary evaluation of the dolomite deposit was carried out by the New Brunswick Mineral Resources Branch. After this initial investigation, no detailed exploration or evaluation work was undertaken until 1976. In that year, a detailed mapping and sampling program initiated by Great Horn Mining Syndicate delineated approximately 10 million tonnes of high-magnesium dolomite.

The Elliot Road dolomite deposit has significant potential as a source of dolomite suitable for use in the production of metallic magnesium, however unfavourable market conditions have provided a deterrent to development.

ELLIOT ROAD LIMESTONE (21 H/5W) Limestone in the Elliot Road area occurs immediately south of the main occurrence described above. The area has been the subject of detailed mapping and sampling programs in 1970 and 1972 by Amax of Canada Ltd. A sizable deposit of limestone with CaO ranging from 45.0 to 50.0% has been delineated, however the grade and tonnage were not adequate for the company's use. Little work has been carried out on the property since 1972.

NAUWIGEWAUK LIMESTONE (21 H/5W) This limestone occurrence is located about 20 km northeast of Saint John, immediately north of the Elliot Road deposit and has been subjected to detailed mapping, sampling and drilling (461 m) by Amax of Canada Ltd. This work has resulted in the delineation of several zones of high-calcium limestone. The area appears to be more than adequate for a quarrying operation. No work has been performed on the property since 1972.

BROOKVILLE DOLOMITE (21 G/8E) This property is situated in East Saint John and has been in production for over 60 years. Brookville Manufacturing Co. Ltd. currently operates the existing quarry and produces approximately 100,000 tonnes of agricultural dolomite and 200,000 tonnes of aggregate annually. There appears to be adequate reserves for at least 10 years and the company is expected to continue operation in the future.

WINDSOR AND CRAIG BROOK LIMESTONE (21 J/6W) The Windsor and Craig Brook limestone deposits are located about 12 km east of Hartland in Carleton County. The Windsor deposit is located along Highway 580 at Windsor while the Craig Brook deposit is found 3.8 km south of the Windsor deposit near Carlisle. The mineral rights to these deposits are currently held by Omni Mines Ltd. Comprehensive mapping, sampling and drilling (11 holes) of the two properties carried out by Stratmat Ltd. in 1955 has outlined a possible total of 10 million tons of high-calcium limestone averaging 90.0% $CaCO_3$.

Although these two properties currently have been the subject of a feasibility study concerning the establishment of a 100,000 ton/year processing plant, specializing in the manufacture of agricultural lime and related products, no development has taken place to date.

ELMTREE LIMESTONE (21 P/13W) The Elmtree limestone deposit is situated about 20 km north of Bathurst near the Village of Petit Rocher, Gloucester County. A quarry has existed here since 1880 and was operated on a 2000 ton/year basis from 1930 to 1960 by Elmtree Co-op. Since 1960, the quarry has been only operated intermittently.

In 1978, the property was acquired by Elmtree Resources Ltd. Following extensive trenching and detailed mapping, the existing quarry has been expanded and put back into production. In addition, a crushing, screening plant and large storage facility have been constructed.

Reserves have been estimated at 7.0 million tonnes of high-calcium stone with a cut-off grade of 50% CaO based on recent exploration. This is more than adequate to maintain a 10- to 15-year operation based on current production levels.

Recent exploration, consisting of trenching south and to the east of the existing quarry, has indicated that highest quality stone is restricted to a number of large limestone lenses.

In 1981, about 50,000 tonnes of limestone was quarried, crushed and sold to Brunswick Mining and Smelting Corporation Limited for flux in their lead smelter at Belledune, New Brunswick. Production of agricultural lime and some construction stone took place in 1981.

MANGANESE

WOODSTOCK MANGANESE (21 J/4E) Woodstock manganese consists of several deposits associated with Silurian manganiferous slates located on the south side of the Meduxnekeag River, about 8 km west of the Town of Woodstock, Carleton County. The following is a brief historical account of the Woodstock deposits:

1836 - Discovered
1848 - Woodstock Charcoal Iron Company erected blast furnace for pig iron
1853 - Woodstock ore used in manufacture of armor plating for English navy
1953 - Fundy Bay Copper Mines Limited acquired 20 sq. mile concession and optioned property to Strategic Manganese Corporation
1956 - Strategic Manganese erected a concentrator
1956-62 - Small quantities of ore were mined and milled and about 6000 tons of concentrate were shipped to Niagara Falls for metallurgical testing
1969 - Strategic Manganese claims expired
1970 - Mandale Refining staked the Woodstock manganese deposits
1972 - Mandate's claims expired
1975 - R. S. Boorman staked 29 claims covering Woodstock manganese deposits
1976 - Geology and geochem. studies were conducted on the manganese orebodies

It is estimated that six deposits in the area contain approximately 194 million tons of ore averaging 9.0% Mn.

ST. LEONARD IRON AND MANGANESE (21 O/4W) This iron and manganese property is located approximately 5 to 6 km north of St. Leonard, Madawaska County. The property was staked about 24 years ago, however preliminary work indicated nothing of economic importance at that time. Early in 1973, Mr. Amos Farrell (Farrell Mines Ltd.) became interested in the property and renewed exploration activities. Since that time, extensive trenching, geophysical surveys and a series of diamond drill holes have revealed considerable iron and manganese mineralization.

The deposit has been traced for more than 5,000 feet and consists of two parallel bands with an average width of less than 100 feet. Chip samples over 20-foot intervals indicate 14.3 to 27.5% iron and 7.75% manganese oxide.

POTASH, SALT

MILLSTREAM POTASH-SALT (21 H/12E) This property is located 4 km west of Apohaqui, Kings County (10 km southwest of Sussex). A drill hole (Millstream No. 1) completed in 1973 by the Department of Natural Resources penetrated about 12 m of potash-bearing salt at a depth of approximately 915 m before abandonment was caused by technical difficulties.

In May of 1980 the Province called for tenders for the right to explore and develop a salt-potash prospect at Millstream and five tenders were received. After careful evaluation the Province awarded the rights to BP Exploration Canada Ltd. Under the exploration agreement BP agreed to a 6¼% royalty on all potash produced as well as a 21.1% share of the accumulated value of net cash profits after earning a discounted cash profit return on investment of 15% before deducting Federal and Provincial corporation taxes. Drilling on the property is expected to commence early in 1981.

By the end of 1981, BP Exploration Canada Ltd. had completed 5 drill holes and spudded in a sixth.

PLUMWESEEP-PENOBSQUIS POTASH-SALT (21 H/11W, 21 H/14W) This property is located 5 km east of the Town of Sussex, Kings County. Following the discovery of potash in the Plumweseep-Penobsquis area by the New Brunswick Department of Natural Resources (Plumweseep No. 1) in 1971, exploration and development rights covering a 360 km^2 reservation area were granted to the Potash Company of America in 1973. The company currently holds a 19,187.0 hectare mining lease. After a comprehensive exploration program and feasibility study, the company decided to proceed with the construction of a 5 m diameter exploratory mine shaft in the spring of 1978. The exploration shaft was completed in April of 1980 and underground exploration was completed in October, 1980. On October 27, 1980 the Potash Company of America announced that it was proceeding to production with a mine capacity of 1 million tonnes per year. Preliminary reserve estimates indicate tonnages sufficient to support a 20- to 30-year mine life. Production is anticipated by early to mid-1983.

The Potash Company of America is presently sinking a production shaft and constructing a concentrator and storage facilities. Work is also under way on port handling facilities in Saint John.

SALT SPRINGS POTASH-SALT (21 H/12E) The Salt Springs potash-salt deposit is located about 20 km southwest of Sussex, Kings County, and was discovered by the Department of Natural Resources in 1973. Subsequent exploration and development rights to a 120 km^2 reservation area were granted to International Minerals and Chemical Corporation. Full-scale exploration involving 22 drill holes began in 1975, and was successful in confirming sufficient ore to support a 1 million ton per year plant for 20 to 30 years.

Despite extremely encouraging results of the drilling program, I.M.C. decided to sell the property to Denison Mines Ltd. of Toronto late in 1978. Construction of a 5 m diameter exploration mine was commenced in September, 1979 and will reach a depth of over 730 m when completed in early 1982.

Like P.C.A., Denison plans to thoroughly investigate the potash deposit underground before making a production decision which is expected by the end of 1982. It is anticipated that production could commence sometime in 1985 if the exploration provides satisfactory results and provide permanent employment for 250-300 persons. It is anticipated that production rates will be 1 to 1.2 million tonnes per year of KCl.

In December of 1980 Denison Mines Ltd. assigned a 40% interest to the Potash Company of Canada Ltd. (Potacan). Potacan is owned jointly by Entreprise Miniere et Chemique and Kali und Salz AG. Denison Mines Ltd. remains the overall development manager, but potash sales will be handled by Potacan.

DORCHESTER POTASH-SALT (21 H/15) In April, 1981 the Minister of Natural Resources called for tenders on the exploration rights to salt and potash on a 50,000 hectare area from Dorchester to Baie Verte. In 1949, Shell Oil Company's Dorchester No. 1 drill hole intersected 1170 m of Windsor age salt and in 1960, Imperial Oil's Dorchester No. 1 intersected 860 m of Windsor age evaporites. Recent gravity work by the Mineral Development Branch indicated several anomalies in the Dorchester Synclinorium and all were included in the tender package.

The tender request drew only limited response and as a result the Province elected not to award the rights for potash exploration at the time.

SILICA

BURCHILL ROAD SILICA (21 G/1E) The deposit is located in the vicinity of Frenchmans Creek, 12 km southwest of Saint John. The property was staked by Mr. W. Walton and Mr. M. Gordon in 1970-72; however, in 1971, the area was expropriated as part of the Saint John Deep port development. The property since 1974 has been under litigation.

The deposit, consisting of quartzite, has been the subject of detailed mapping and sampling by various workers from 1968 to 1975. Probable reserves have been calculated in the order of 10 million tonnes to a depth of 30 m grading 91.4% SiO_2, 3.2% Al_2O_3 and 1.0% Fe_2O_3. The material can be significantly beneficiated by acid washing and magnetic separation.

NANTUCKET ISLAND SILICA (21 B/10) Nantucket Island is approximately one-half mile east of Grand Manan Island near the middle of the Bay of Fundy. It has an area of approximately one-quarter square mile.

Access to Grand Manan is by car-ferry from Blacks Harbour, and Nantucket Island can be reached by small boat from Woodwards Cove, Grand Manan.

Mining claims covering Nantucket Island have been held by Great Horn Mining Syndicate since 1974. The company's interest was a result of encouragement by the New Brunswick Research and Productivity Council to acquire deposits of silica suitable for the production of ferrosilicon for potential use in magnesium metal production at Lorneville.

Mapping and sampling have indicated potential of 2 million tonnes grading 98% silica, assuming that no quarrying is to be conducted below high tide level.

Development of the deposit is contingent on the development of the Lorneville dolomite.

WHITE HEAD ISLAND SILICA (21 B/10) White Head Island is approximately 2.5 miles southeast of Grand Manan Island near the middle of the Bay of Fundy. Access to Grand Manan is car-ferry from Blacks Harbour, and a small ferry boat operates between Ingalls Head (Grand Manan) and White Head Island.

Mining claims covering the deposit have been held by the Great Horn Mining Syndicate since 1974 in conjunction with claims held on Nantucket Island.

Mapping and sampling have indicated potential reserves of 770,000 tonnes grading 98% silica, assuming that no quarrying is to be conducted below high tide level. If quarrying takes place to a 7.5 m depth below high tide, potential reserves increase to 2.25 million tonnes.

Development of the deposit is contingent on the development of the Lorneville dolomite. In addition, the occupied houses along the east side of the peninsula would have to be purchased before full-scale quarrying can proceed.

WEST BEACH-CAPE SPENCER SILICA (21 H/4W) The West Beach silica occurrence outcrops along the coast of the Bay of Fundy, 20 km east of Saint John. Access is by a 4 km long bush road from the Old Black River Road. The two Cape Spencer silica occurrences are located 14 km southeast of Saint John and 8 km southwest of the West Beach occurrence; access to the western Cape Spencer occurrence, near Millican Brook, is by a 0.8 km long bush road from the Mispec-Cape Spencer Road.

These deposits occur as large quartz veins and were first reported by Alcock in 1938. Mining claims to the properties are currently held by Mr. W. Walton and Mr. M. Gordon of Pennfield Metallics. Preliminary mapping and surface sampling by Webb and Kingston of the Mineral Resources Branch were carried out in 1974. In 1975, Union Carbide Exploration Corporation performed additional mapping and drilled 16 shallow test holes (0.6 to 2.0 m) at West Beach in an effort to further test the quality of the material; however, they failed to adequately assess the deposit's potential.

In 1977, the West Beach and Cape Spencer properties were optioned to Ahlstrom Canada Limited of Moncton, who were interested in locating suitable raw materials for the manufacture of glass. Geologic mapping, diamond drilling (180 m) and extensive chemical analyses were conducted under the supervision of R. S. Boyle. Drilling indicated considerable grade variation and irregular thicknesses of the quartz vein system in both areas.

Variation in grade and lack of sufficient reserves, in addition to poor access, did not justify the areas as a suitable source for glassmaking raw materials. These deposits would be suitable for sandblast and moulding sand raw materials and for making brown glass. In 1981 several samples obtained by trenching were taken by Mr. Gordon for crushing and evaluation.

BASS RIVER SILICA (21 P/12E) The Bass River silica deposit is located approximately 6.5 km northeast of Bathurst and is the only silica property in the Maritimes that is currently under development. The silica consists of a silica-rich sandstone band in the extensive Clifton Formation. It has been estimated that over 600,000 tonnes of 95% (plus) SiO_2 is available in the vicinity.

The property was originally explored by East Coast Smelting and Chemical Company Ltd. in the early sixties and a quarry was opened by Worldwide Explorations in 1974. In 1976, the quarry was purchased by Godin M & E and is operated under the name of Chaleur Silica Ltd.

The quarry is operated on a seasonal basis only and produced in the order of 30,000 tonnes of silica flux in 1981 to the lead smelter at Belledune, as well as supplied several thousand tonnes of silica to Canada Cement LaFarge Ltd. in Havelock.

Quarrying is still continuing and new markets may allow expansion of the operation.

GYPSUM

INTERVALE GYPSUM (21 H/14E) The Intervale gypsum deposit is situated immediately north of Petitcodiac between Hillgrove and Intervale. A quarry has operated there intermittently since the late 1800's. In 1950, the Intervale property was acquired by Canada Cement LaFarge Ltd. who operated the quarry on an annual basis. The property is estimated to contain over 4 million tons grading 97% $CaSO_4$ and the quarry is capable of producing 5,000 to 30,000 tons of gypsum per year as required by the Canada Cement plant in Havelock where it is used as a portland cement retarder.

Quarrying is expected to continue in the future in response to the demand for gypsum by the company.

HILLSBOROUGH GYPSUM (21 H/15E) The Hillsborough gypsum deposit has been quarried in several areas, 4 or 5 km west of the Town of Hillsborough. Quarries in this area have been operated by various companies for over 100 years. Since 1930, Canadian Gypsum Co. Ltd. has carried on production until 1980.

In December of 1980, the Canadian Gypsum Co. Ltd. announced the closure of its Hillsborough wallboard operations and the Province started negotiations in 1981 for the return of the mineral rights to gypsum which had been held "in perpetuity" by the company since the early 1930's.

CHAPTER 6. CONSTRUCTION MATERIALS

Minerals produced in New Brunswick in direct support of the construction industry include sand, gravel, crushed stone, stone, cement, lime clays and shales. Many of these commodities are high bulk, low unit value and transportation cost-sensitive. In addition, operations producing these commodities are generally the first mineral-associated industries to be influenced by changes in the economic climate.

The value of construction materials produced in New Brunswick in 1981 was $44.36 million (preliminary estimate, Statistics Canada) compared to $40.98 million in 1980. This maintains the value of construction materials produced in New Brunswick at about 11% of the total mineral production value for the province.

CEMENT

Canada Cement LaFarge Ltd. continued to operate a cement manufacturing plant at Havelock, New Brunswick in 1980' although several shutdowns were experienced due to poor markets. The plant, which was built in 1951, was expanded in 1966 by the addition of a second kiln. In 1974 the company installed heavier grinding equipment and larger storage facilities bringing the production capacity to 315,000 tons a year.

Preliminary estimates of the production value of cement are $12.5 million compared to $11.60 million in 1980.

LIME

Lime is produced by Havelock Processing Ltd. at Havelock, New Brunswick. The company produces a high-calcium quicklime utilizing a 90 ton per day rotary kiln. Markets include mineral processing operations and pulp and paper industries both within the province and within the State of Maine. Havelock Lime Works Ltd. operates the company's crushed limestone plant which offers a range of products from agricultural limestone, crushed stone for concrete and asphaltic aggregates to finely pulverized filler material.

Brookville Manufacturing Company Ltd. operates a crushing plant producing a crushed dolomitic limestone for use as agricultural limestone, concrete and asphaltic aggregate and finely pulverized filler material. Elmtree Resources Limited of Bathurst produces crushed limestone from its limestone deposit in Gloucester County for use as a flux in mineral processing, and agricultural lime.

Preliminary estimates of the value of lime production in 1981 are $3.50 million compared to $3.34 million in 1980.

CLAY PRODUCTS

L. E. Shaw Ltd. continued to operate a brick plant at Chipman, New Brunswick using a local red shale. This plant produces facing brick, drainage tile, partition tile, radial tile and an interlocking tile.

Preliminary estimates of the value of clay product production in 1981 are $1.6 million compared to $2.44 million in 1980.

STONE

BUILDING STONE Nelson Monuments Limited of Sussex continued to produce monuments, markers and curbing although much of the granite used was imported from Ontario and South Africa.

Alpha Enterprises Ltd. of Bathurst produced a limited amount of ashlar stone from its Antinouri Lake granite quarry.

CRUSHED STONE Moncton Crushed Stone Company Ltd., a subsidiary of Modern Enterprises, continued to produce crushed stone at Stilesville, Westmorland County. This company also continued production of manufactured fine concrete aggregate by blending, washing -¼ inch mesh crushed stone with sand brought in from Rogersville.

Moncton Crushed Stone Company Ltd. is the main supplier of aggregate in the Moncton and surrounding areas with their products being sold to concrete and paving companies and individuals.

H. E. Carson Ltd. operated a quarry in the Stilesville area producing crushed stone and rip rap.

Acadia Crushed Stone Ltd., another subsidiary of Modern Enterprises, produced crushed stone from its plant at Gayton, Westmorland County. MacDonald's Paving and Construction Ltd. also produced crushed stone from a second quarry at Gayton.

Forbes and Sloat operated a quarry and crusher operation at Douglas, outside Fredericton.

Diamond Construction Ltd. continued to operate its quarry and crushing plant at Springhill. The material crushed is greywacke.

Brookville Manufacturing Company Ltd. of Brookville, Saint John County, and Havelock Lime Works Ltd., continued to produce crushed limestone for concrete and asphaltic aggregate.

Preliminary estimates of stone produced in 1981 are 3.4 million tonnes at a value of $12.7 million compared to 3.05 million tonnes at a value of $11.0 million in 1980.

SAND AND GRAVEL

Sand and gravel may be extracted in New Brunswick by obtaining permission of the land owner as the rights to such commodities are vested in the land owner. As such, the province controls approximately 42 per cent of the land and permits removal of sand and gravel under a permit issued by the Minister of Natural Resources under the Quarriable Substances Act.

Preliminary estimates of sand and gravel production in 1981 (Statistics Canada figures) indicate that production was at 7.0 million tonnes with a value of $14.0 million compared to 6.4 million tonnes with a value of $12.4 million in 1980.

Figures for the quantity of sand and gravel removed from Crown lands in 1981 are accurately computed at 1.67 million tonnes at a value of $1.67 million compared to 1.26 million tonnes with a value of $1.26 million in 1980.

APPENDIX

Table 1

Mineral Production
New Brunswick
1981

PRELIMINARY ESTIMATE

	Units	Quantity	$ Value
METALS			
			2,876,000
Antimony		-----------	527,000
Bismuth	kg	76,000	28,359,000
Copper	kg	12,821,000	1,174,000
Gold	gm	152,000	63,732,000
Lead	kg	64,920,000	77,702,000
Silver	kg	192,000	278,462,000
Zinc	kg	232,051,000	452,832,000
NON-METALLICS			
Gypsum	tonne	18,000	87,000
Peat	tonne	119,000	11,383,000
Quartz (Silica)	tonne	-----------	1,100,000
Salt	tonne		759,354
Sulphur in Smelter Gas	tonne	72,000	1,724,000
			15,053,354
FUELS			
Coal	tonne	520,000	23,000,000
Natural Gas	M^3	2,038	42,000
Petroleum Crude	M^3	331	38,000
			23,080,000
STRUCTURAL MATERIALS			
Clay Products		-----------	1,600,000
Cement		-----------	12,516,000
Lime		-----------	3,497,000
Sand and Gravel	tonne	7,000,000	14,000,000
Stone	tonne	3,400,000	12,750,000
			44,363,000
GRAND TOTAL 1981 (PRELIMINARY)			535,328,354

Table 2

The Mineral Production of New Brunswick

1956 to 1981

Date Calendar Year	Metals	Non-Metallics	Fuels	Structural Materials	Total
1956	$ 337,234	$ 744,262	$ 8,155,040	$ 9,021,766	$ 18,258,302
1957	4,789,658	951,178	8,424,346	9,056,683	23,221,865
1958	1,114,700	944,321	6,964,888	8,576,845	17,600,754
1959	-----	941,330	8,533,822	8,636,080	18,111,232
1960	-----	1,101,722	8,834,749	7,136,268	17,072,739
1961	-----	1,379,335	7,686,695	9,738,355	18,804,385
1962	3,483,969	1,571,082	6,900,984	9,855,540	12,811,575
1963	9,255,246	1,224,450	7,352,023	10,511,700	28,343,419
1964	29,648,079	1,099,685	8,573,688	9,355,260	48,676,712
1965	62,461,357	1,742,662	8,742,980	9,210,353	82,158,352
1966	69,386,294	1,894,992	8,005,535	10,934,416	90,221,237
1967	67,957,099	2,427,150	7,568,509	12,465,932	90,418,690
1968	69,622,942	2,915,246	7,436,931	8,476,317	88,451,436
1969	77,562,887	3,603,831	5,757,473	7,668,374	94,592,565
1970	89,939,781	2,785,381	3,086,033	8,979,360	104,790,555
1971	91,049,256	2,902,648	4,038,971	9,242,071	107,232,946
1972	98,772,724	3,820,526	3,552,863	14,024,867	120,170,980
1973	132,797,907	4,243,694	3,434,416	23,701,754	164,177,771
1974	184,142,991	5,742,863	5,441,537	21,255,701	216,583,092
1975	197,230,888	6,252,923	7,473,197	20,965,912	231,922,920
1976	195,340,976	7,163,466	5,988,243	30,090,493	238,583,178
1977	238,583,350	10,037,550	6,333,791	34,439,352	289,394,043
1978	281,770,379	11,467,716	8,811,135	37,670,743	339,719,973
1979	419,123,591	11,658,369	10,394,844	38,510,412	479,687,216
1980	327,457,000	12,978,716	17,282,186	45,684,000	374,129,479
1981 (P)	$452,832,000	$15,053,354	$23,080,000	$44,363,000	$535,328,354

Table 3

Distribution of Employees in the Mining Industry (1981)

Employed as of Dec. 31, 1981	Company	Minerals
	METAL MINES	
1883	Brunswick Mining and Smelting Corporation Limited (mine) Bathurst, N. B.	Zn, Pb, Cu, Ag, Bi, Au
613	Brunswick Mining and Smelting Corporation Limited (smelter) Belledune, N. B.	Pb metal, Ag, sulphuric acid
653	Heath Steele Mines Limited (mine) Newcastle, N. B.	Zn, Pb, Cu, Ag
35	Anaconda Canada Limited Bathurst, N. B.	Zn, Cu, Pb
21	Consolidated Durham Mines and Resources Limited (mine) Lake George, N. B.	Sb
405	Mount Pleasant Tungsten Mine (development) Mount Pleasant, N. B.	Mo, W
3610	Total Metal Mines and Smelter	
	INDUSTRIAL MINERALS	
28	Brookville Manufacturing Company Limited (quarry) Saint John, N. B.	lime, dolomitic lime, construction stone
15	Chaleur Silica Limited Petit Rocher, N. B.	Flux, sandblasting sand
28	Elmtree Resources Ltd. Bathurst, N. B.	limestone products
60	Havelock Lime Works (quarry and plant) Havelock, N. B.	various limestone products
110	Canada Cement Lafarge Limited (quarry and plant) Havelock, N. B.	cement
511	Potash Company of America (development work) Sussex, N. B.	potash, salt
60	Denison Mines Limited (development work) Sussex, N. B.	potash
172	Peat moss production	
110	Belledune Fertilizer	
54	L. E. Shaw Ltd. (clay products)	
1148	Total Industrial Minerals	
	ENERGY RESOURCES	
242	N. B. Coal Limited (producer) Minto, N. B.	coal
5	Irving Oil Ltd. (producer) Stoney Creek, N. B.	oil and gas
247	Total Energy Resources	
	STRUCTURAL MATERIALS	
850	Estimated total, all pits, quarries, crushing plants, etc.	
5855	Total	

Table 4

New Brunswick Mining Industry - Employment 1970-1981
(as of December 31)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Brunswick Mining												
Mine	1,209	1,231	1,317	1,358	1,646	1,820	1,888	1,593	1,547	1,725	1,773	1,883
Smelter	669	606	319	472	558	579	536	541	534	568	606	613
Heath Steele	427	495	469	443	533	487	550	517	438	510	544	653
Anaconda Caribou	209	30	10	87	13	10	6	7	7	7	11	35
Sullivan Group												
Nigadoo	319	42	14	165	265	254	203	44	9	-	-	-
Brunswick Tin (Mount Pleasant)	38	14	24	28	66	31	4	-	3	3	121	405
Chester	17	12	-	-	21	4	-	-	-	-	-	-
Consolidated Durham	-	113	91	83	104	106	99	99	100	98	74	21
Key Anacon	-	-	-	-	-	-	-	-	-	-	1	1
Burnt Hill Tungsten	-	-	-	-	-	-	-	-	18	16	20	2
Total Base Metals	2,888	2,543	2,244	2,636	3,206	3,291	3,286	2,801	2,656	2,927	3,150	3,613
Denison Mines Ltd.	-	-	-	-	-	-	-	-	-	53	54	60
P.C.A.	-	-	-	-	-	-	-	-	58	73	226	511
British Petroleum	-	-	-	-	-	-	-	-	-	-	-	8
Underground Coal Operations	90	26	-	-	-	-	-	-	-	-	-	-
Strip Coal Operations	212	185	210	201	216	247	236	256	266	248	255	242

Table 5

Taxes Pertaining to Mining Operations in New Brunswick

(i) FEDERAL TAX

PRODUCTION REVENUE			100.0(1)	
DEDUCT:	(a) Resource Allowance, 25% of (1)	25		
	(b) Exploration, Development Costs	10(2)		
	(c) Earned Depletion, 33% of (2)	3.3		
	Total Deductions	38.3	38.3(3)	
TAXABLE INCOME: [(1) - (3)]			61.7(4)	
TOTAL FEDERAL TAX PAYABLE: 37.8%* of (4)				23.3

* includes temporary surtax of 5% of regular tax rate of 36%

(ii) PROVINCIAL TAX*

PRODUCTION REVENUE			100.0(1)	
DEDUCT:	(a) Smelting Costs	25		
	(b) Transportation	10		
	(c) Direct Milling Costs	15		
	Total a, b, c = 50 (2)			
	(d) Other Operating Costs	8		
	(e) Salaries	16		
	(f) Insurance	1		
	(g) Provincial Property and Business Tax	1		
	(h) Depreciation (A)	5		
	(i) Workman's Compensation	1		
	(j) Donations	1		
	(k) Net Revenue Tax, 2% of (2)	1		
	(l) Rentals	1		
	(m) Finance Allowance (B)	2		
	(n) Processing Allowance (C)	5		
	Total Deductions	92	92 (3)	
TAXABLE NET PROFIT: [(1) - (3)]			8 (4)	
N. B. MINING TAX: 16% of (4)			1.28	
NET REVENUE TAX: (k)			1.0	
TOTAL N. B. TAX PAYABLE:				2.28

Note: Bill C46, 1981, effective 1982 04 01

Depreciation:

(i) an allowance of not less than 5% of the original cost of the undepreciated depreciable assets used

(A) in a new mine or processing plant, or

(B) in an expansion of an existing mine or processing plant, if the capacity of the mine or processing plant, measured in tons of feed is, in the year immediately following the expansion, increased at least 25% over the year immediately preceding the expansion; and

(ii) not more than 33-1/3% of the original cost of other undepreciated depreciable assets.

Processing Allowances:

8% of the original cost of milling or concentrating assets, plus

15% of the original cost of smelting or refining assets

The total amount to be deducted for calculating the net revenue tax shall not be in excess of 25% of net revenue. In other calculations the minimum is 15%, and the maximum is 65% of net profits.

The rate of Provincial Corporate Income Tax is 14%.

Table 6

Staff - Mineral Resources Division

	Mines or Mineral Development						Mineral Resources or Geological Surveys						
	Admin	Geologist Mining Eng	Tech	Steno Secty	Draft	Total	Admin	Geologist Mining Eng	Tech	Steno Secty	Draft	Total	Total Division
1953-54	1	1	1	3	-	6							6
1954-55	2	1	1	4	-	8							8
1955-56	4	-	3	6	2	15							15
1956-57	4	-	3	8	2	17							17
1957-58	5	1	2	9	2	19							19
1958-59	5	1	2	9	2	19							19
1959-60	5	1	4	10	1	21	→ INCLUDES MINERAL LANDS						21
1960-61	5	1	3	10	1	20							20
1961-62	5	1	2	10	2	20							20
1962-63	5	1	2	11	2	21							21
1963-64	5	1	2	10	2	20							20
1964-65	5	2	2	9	2	20							20
1965-66	5	6	3	8	2	24							24
1966-67	5	8	3	8	2	26							26
1967-68	2	-	3	-	-	5	3	9	1	7	2	22	27
1968-69	2	-	3	-	-	5	3	10	1	7	2	23	28
1969-70	2	-	3	-	-	5	3	7	1	6	3	20	25
1970-71	3	-	2	-	-	5	3	7	4	5	3	22	27
1971-72	3	-	2	-	-	5	3	7	4	5	3	22	27
1972-73	3	-	3	-	-	6	3	8	4	5	3	23	29
1973-74	3	-	3	-	-	6	3	8	4	5	3	23	29
1974-75	3	-	3	-	-	6	4	8	3	6	3	24	30
1975-76	3	-	4	-	-	7	4	8	2	6	3	23	30
1976-77	3	-	4	-	-	7	4	8	2	6	3	23	30
1977-78	4	-	6	-	-	10	2	8	2	4	3	19	29
1978-79	2	-	5	-	-	7	4	9	3	5	3	24	31
1979-80	-	-	-	-	-	-	4	13	6	8	3	34	34
1980-81	-	-	-	-	-	-	8	13	6	8	3	38	38
1981-82	2	6	1	1	-	10	6	8	7	6	2	29	39

Table 7

Mines Division
Expenditures, Staff, Revenue 1964-1981

	EXPENDITURES						STAFF			REVENUE
YEAR	PROV. PROJECTS(1)	ADMIN.	TOTAL(2)	D.R.E.E. PROJECTS(3)	TOTAL(1)&(3) PROJECTS	TOTAL(2)&(3) EXPENDITURES	TOTAL PERMANENT	TOTAL CASUAL		TOTAL REVENUE
1964-65							20			364,877
1965-66						274,663	24			908,502
1966-67						329,292	26			563,404
1967-68						381,478	27			278,464
1968-69						341,671	28			292,257
1969-70						321,162	25			417,949
1970-71	75,110					626,289	27	13	40	319,278
1971-72	136,170	294,151	430,321	367,953	504,123	798,274	27	13	40	303,030
1972-73	129,702	319,582	449,284	455,389	585,091	904,673	29	13	42	233,525
1973-74	197,700	405,614	603,314	923,705	1,121,406	1,527,020	29	13	42	592,550
1974-75	128,127	470,027	598,154	786,158	914,285	1,384,312	30	13	43	2,165,711
1975-76	166,348	614,054	780,402	844,190	1,010,538	1,624,592	30	13	43	2,561,458
1976-77	203,048	706,469	909,517	1,347,114	1,550,162	2,256,631	30	13	43	863,888
1977-78	241,796	746,938	988,734	1,508,004	1,749,800	2,496,738	29	14	43	1,135,828
1978-79	147,201	916,212	1063,413	2,167,640	2,314,841	3,231,053	30	13	43	3,040,492
1979-80	125,421	672,358	797,779	1,493,886	1,619,307	2,291,665	36	12	48	10,736,752
1980-81	241,974	725,921	967,895	1,387,844	1,629,818	2,355,739	36	12	48	8,141,862
1981-82	263,715	900,935	1,164,650	1,401,048	1,664,763	2,565,698	36	13	49	7,887,661

Table 9

Prospecting Licences, Claims, Licences, Leases (1953-1981)

Year	Prospect. Licences Sold	Claims Recorded	Claims in Effect	Mining Licences*	Mining Leases*	Total Claims & Claim Equivalents	Reservations (Acres)	Oil Shale Licences Leases (Acres)	Oil-Gas Licences Leases
1953		41,606	41,606			41,606			6,400,000
1954	3,681	18,975	39,719			39,719			6,400,000
1955	2,145	17,464	41,624			41,624			6,400,000
1956	1,714	22,041	43,220	8,354		51,574			6,400,000
1957	1,850	6,261	27,334	6,771		34,105			6,400,000
1958	770	2,643	9,118	5,276		14,394			6,400,000
1959	351	4,558	7,229	3,632		10,861			"
1960	506	4,839	6,830	3,161		9,991			"
1961	424	1,641	3,374	2,827		6,201			"
1962	319	2,996	4,683	2,405		7,088			"
1963	406	1,602	3,923	2,445		6,368			"
1964	194	4,428	5,886	2,534	126	8,546			"
1965	424	6,398	8,920	2,574	135	11,629			"
1966	443	9,754	13,350	2,505	55	15,910			"
1967	520	5,356	10,422	2,242	341	13,005			"
1968	392	5,693	8,654	2,161	341	11,156			5,937,000
1969	574	7,439	11,684	2,201	341	14,226		58,880	7,193,659
1970	512	5,018	10,181	2,272	341	12,791		58,880	"
1971	349	3,978	8,352	2,265	427	11,044		58,880	"
1972	298	2,888	6,772	2,120	397	9,289	0	58,880	"
1973	227	3,489	6,727	1,983	397	9,107	142,350	0	"
1974	244	3,726	7,662	2,128	397	10,187	142,350	1,000,210	"
1975	281	4,690	9,476	2,168	397	12,031	191,360	1,000,210	"
1976	368	7,254	14,642	2,254	397	17,293	191,360	1,000,210	4,636,987
1977	369	2,944	12,717	3,049	397	16,163	191,360	500,105	4,636,987
1978	369	6,717	12,963	3,753	397	17,113	191,360	500,105	4,500,035
1979	460	8,209	16,431	4,179	397	21,027	191,360	500,105	4,500,035
1980	483	7,274	18,466	4,120	397	23,488	191,360	202,500**	190,233**
1981	436	5,115	18,714	10,426	397	29,934	191,360	202,500**	217,176**

* Claim equivalents (1 claim = 40 acres)
** Hectares

Table 11

Summary of Metallic Concentrate Production in New Brunswick

1957-1981

		CONCENTRATES (SHORT DRY TONS)			
YEAR	ORE (SHORT TONS)	COPPER	LEAD	ZINC	BULK
1957	335,849	33,330	9,996	11,024	-
1958	71,839	2,261	4,863	5,097	-
1959	-	-	-	-	-
1960	-	-	-	-	-
1961	-	-	-	-	-
1962	359,145	36,233	3,308	10,176	-
1963	528,961	41,403	14,244	20,517	-
1964	1,542,489	42,432	88,135	160,352	-
1965	2,215,348	37,687	148,573	279,174	-
1966	2,532,012	34,216	140,579	264,633	65,961
1967	3,124,683	29,823	150,089	306,806	89,918
1968	3,476,019	36,938	189,823	312,751	46,330
1969	3,480,744	32,646	111,624	234,958	118,847
1970	3,926,429	38,453	134,217	251,629	110,984
1971	4,460,089	54,474	183,594	336,319	72,994
1972	4,125,715	40,628	195,901	369,006	-
1973	4,463,056	51,875	185,595	409,058	-
1974	4,144,445	69,955	158,054	412,768	-
1975	4,838,743	56,627	211,926	432,679	-
1976	3,939,934	47,348	170,329	345,424	35,551
1977	4,933,656	57,457	241,757	471,817	34,574
1978	4,720,307	44,938	253,323	494,294	45,271
1979	4,661,667	47,659	274,487	509,716	40,249
1980	3,502,949	40,970	181,360	343,937	90,269
1981	5,171,007	59,545	266,218	524,048	

Table 12

Production 1964-1981

Brunswick Mining and Smelting Corporation
(Mining Division)

YEAR	TONS MILLED	S.D. TONS CONCENTRATE PRODUCED				TONS TO TAILINGS
		LEAD	ZINC	COPPER	BULK	
1964	971,485	70,370	132,760	--	--	768,355
1965	1,655,559	132,773	252,036	--	--	1,270,750
1966	1,975,202	125,250	237,107	--	65,961	1,546,884
1967	2,536,268	129,280	258,812	5,910	89,918	2,052,348
1968	2,708,746	158,376	272,960	12,940	46,330	2,218,140
1969	2,830,632	90,158	205,237	13,875	118,847	2,402,515
1970	2,582,186	75,567	153,050	8,790	110,984	2,233,795
1971	3,039,552	124,884	242,108	4,574	72,994	2,594,992
1972	3,257,559	172,852	320,832	17,630	--	2,746,245
1973	3,288,100	153,500	330,800	19,900	--	2,783,900
1974	2,625,936	114,451	255,965	20,329	--	2,235,191
1975	3,427,239	170,686	357,423	27,786	--	2,871,344
1976	2,477,126	123,580	255,704	18,219	--	2,079,623
1977	3,455,071	201,056	390,363	19,701	35,551	2,808,400
1978	3,371,199	219,236	399,199	15,796	34,574	2,702,394
1979	3,275,843	227,214	416,601	18,567	45,275	2,568,186
1980	2,037,077	146,359	248,779	11,402	40,249	1,590,288
1981	3,777,875	231,840	440,254	23,284	90,269	2,992,228

Table 13

Smelter Production Statistics*

(in tons)

		1978	1979	1980	1981 (metric)
1st Q	Lead Concentrates Treated	58,020	60,374	52,300	45,500
	Production				
	Refined lead	15,600	15,757	13,400	11,200
	Silver	1,102,296	748,606	870,100	28,900
	Copper matte/speiss	1,548	560	1,200	700
	Sulphuric acid	46,150	52,220	52,200	41,700
2nd Q	Lead Concentrates Treated	121,916	118,064	91,700	91,400
	Production				
	Refined lead	33,320	33,282	25,100	23,700
	Silver	1,984,121	1,534,458	1,428,600	48,300
	Copper matte/speiss	3,091	2,177	1,800	1,500
	Sulphuric acid	96,400	106,270	87,500	85,700
3rd Q	Lead Concentrates Treated	177,615	168,016	128,600	136,900
	Production				
	Refined lead	48,674	45,907	35,200	34,400
	Silver	2,385,994	2,081,304	2,074,500	61,900
	Copper matte/speiss	3,841	3,462	3,200	2,100
	Sulphuric acid	139,160	145,870	114,700	118,900
4th Q	Lead Concentrates Treated	233,605	226,833	179,900	186,900
	Production				
	Refined lead	66,878	62,600	49,500	49,100
	Silver	3,668,000	3,096,916	3,043,300	94,000
	Copper matte/speiss	5,503	4,700	4,800	3,300
	Sulphuric acid	184,840	196,380	157,800	159,200

* Silver is reported in ounces prior to 1981

Table 14

Production 1967-1973

Brunswick Mining and Smelting Corporation
(Smelting Division)

Concentrates produced	1967	1968	1969	1970	1971	1972	1973
Concentrates produced (S.D.T.)	----	122,400	126,790	141,196	149,985	----	----
Net ISF metal produced (tons)	----	40,100	60,800	67,679	74,230	1,870	----
SHG zinc (tons)	11,541	25,160	28,776	36,614	44,770	860(1)	----
CG lead (tons)	5,812	11,800	16,797	20,072	22,417	35,980(2)	34,454
Bismuth (lbs)	----	----	----	7,960	26,605	33,870	30,620
Lead-bismuth alloy (tons)	----	----	107	----	----	----	----
Silver (oz)	----	----	317,984	1,072,248	1,142,289	1,562,790	1,254,700
Silver-lead bullion (tons)	68	420	305	----	----	----	----
Sulphuric acid (tons)	79,831	109,500	103,070	77,085	119,000	92,430	100,181
Copper dross (tons)	----	3,780	3,527	2,876	----	----	----
Copper matte (tons)	----	----	57	600	4,711	910	1,230
Cadmium-zinc alloy (tons)	----	55	95	127	----	----	----
Antimony dross (tons)	----	550	499	14	----	----	----
Refined cadmium (lbs)	----	----	----	----	37,358	----	----

Note: (1) Conversion to lead smelter
(2) Includes 7,000 tons lead purchased and upgraded

Table 15

Production 1974-1981

Brunswick Mining and Smelting Corporation
(Smelting Division)

	CONCENTRATE PROCESSED TONNES	PRODUCTION			
		LEAD TONNES	ACID TONNES	COPPER MATTE AND SPEISS TONNES	SILVER KILOGRAMS
1974	134,664	40,117	106,388	2,240	64,850
1975	156,806	46,200	199,157	2,983	68,263
1976	151,500	46,600	108,200	2,711	93,433
1977	187,500	51,200	138,000	4,290	107,554
1978	211,900	60,700	167,800	4,991	114,085
1979	196,800	56,800	178,200	N.A.	96,325
1980	175,318*	44,900	143,200	N.A.	94,646
1981	198,514	49,100	159,200	N.A.	94,000

* includes 43,000 tonnes purchased during strike

Table 16

Consolidated Durham Mines & Resources Limited

Production - 1974-81*

Year	Tons (short) Mined	Av. Grade	Tons (metric) Cons.	Av. % Sb in Cons.	lbs. Sb in Cons.	Ore Reserves	
						Short Tons	Grade (%)
1974	55,111	5.23	3,733	65.67	5,404,545	178,763	4.60
1975	83,825	3.95	3,463	66.13	5,048,765	527,333	5.06
1976	90,270	4.34	4,361	65.97	6,342,591	483,465	4.56
1977	100,780	3.85	3,896	65.94	5,663,723	412,648	4.22
1978	103,576	3.50	3,880	65.58	5,609,669	302,691	3.44
1979	110,415	3.58	4,337	65.67	6,279,001	119,803	3.59
1980	99,530	3.09	3,463	66.86	5,104,498	-	-
1981	39,420	3.54	2,480	66.37	3,628,755	-	-

* From Annual Report and based upon fiscal years ending June 30

Table 17

PRODUCTION

ANACONDA CANADA LIMITED (CHALEUR DEPOSIT)

YEAR	TONS TREATED	TONS COPPER CONCENTRATE PRODUCED	TONS COPPER CONCENTRATE SHIPPED	DESTINATION	TONS TO TAILINGS
1971	147,829	21,691	16,368	Sweden	126,138
1972	-	-	-	-	-
1973	44,397	8,009	1,626	United States	36,388
1974	169,220	21,527	21,805	United States	147,693
1975	-	-	-	-	-
To Date	361,446	51,227	39,799		310,219

NOTE - MINE OPERATED OCTOBER, 1970 TO NOVEMBER, 1971

- REOPENED SEPTEMBER, 1973 AND CLOSED SEPTEMBER, 1974

Table 18

Disposition of Minto Coal

1981

Disposition			Short Tons
Industrial Institutions			3,213
N. B. Electric Power Commission			573,164
Domestic Sales			848
			577,225
Production			571,376
Stockpile:	Jan. 1/81	22,900	
	Dec. 31/81	6,049	
	Decrease		16,851
			588,227
Less Adjustment - Losses at Preparation Plant			11,002
			577,225

Table 19

Coal Production - 1971-81

													CALENDAR YEAR
Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	TOTAL
1981	37394	45142	45107	44227	45820	42972	54161	54890	53586	46833	51154	50090	571376
1980	49437	42118	41265	37231	43925	44589	37250	37859	42712	46576	35335	39960	498257
1979	20564	20196	25792	33086	27491	21889	19150	27930	38422	46831	45300	42225	366876
1978	34005	28398	26408	30637	16831	21334	25095	36142	29199	30071	39369	32987	350476
1977	28048	36161	32267	35456	18555	30054	28825	32799	30155	27088	27052	18258	344718
1976	48939	40943	31145	41318	53208	46569	37890	37135	33579	28960	41952	32319	473957
1975	34318	40756	34953	49818	41554	38867	34209	40299	45582	38552	26943	39969	465820
1974	29523	21819	29469	35281	39325	28637	38491	35121	27844	35084	51518	42936	415048
1973	34781	28196	31465	33255	43822	36607	37740	41499	34098	22719	24220	25817	394219
1972	31827	30240	37105	37130	36407	45156	42768	36623	41658	41808	28103	20719	429544
1971	34038	35475	40072	35425	50444	46514	58644	54113	48246	36709	39891	37638	517209

Table 20

PRODUCTION

NIGADOO RIVER MINES LTD.

YEAR	TONS TREATED	CONCENTRATES PRODUCED			CONCENTRATES SHIPPED			TONS TO TAILINGS
		ZINC	LEAD	COPPER	ZINC	LEAD	COPPER	
PLANT COMMENCED OPERATION NOVEMBER, 1967								
1967	22,530	-	1,702	-	-	-	-	20,828
1968	284,867	9,843	12,407	1,644	7,270	7,600	1,723	260,973
1969	328,709	13,503	15,371	2,175	10,951	17,881	1,356	297,660
1970	313,354	16,671	13,709	2,083	16,671	13,709	2,083	280,891
1971	291,809	14,379	14,087	2,155	13,767	13,260	2,643	261,100
1972	OPERATION SUSPENDED NOV. 21/71 TO DEC./73							
1973	4,390	164	173	32	-	-	-	4,021
1974	205,687	8,739	9,027	1,333	7,176(E)	5,972(C)	-	186,588
1975	255,068	10,912	10,192	767	10,176(E)	10,128(C)	722	233,197
1976	218,527	9,888	8,868	439	10,297(E)	8,611(C)	579(U.S.)	199,332
1977	124,902	5,742	5,216	-	7,884	6,696	70	113,994
To Date	2,049,843	89,841	90,752	10,628	84,194	83,857	9,176	1,858,622

MILLING CEASED AUG. 26/77

Table 21

PRODUCTION

COMINCO WEDGE

YEAR	TONS MILLED	TONS COPPER CONCENTRATE PRODUCED	TONS COPPER CONCENTRATE SHIPPED TO JAPAN
1962	223,920	32,455	17,928
1963	263,022	36,273	39,588
1964	281,656	38,885	39,435
1965	271,649	32,503	37,529
1966	269,295	28,369	29,153
1967	257,019	22,718	22,847
1968	91,041	7,774	10,282
Total	1,657,602	198,977	196,762

PRODUCTION COMMENCED JAN., 1962

PRODUCTION CEASED MAY, 1968

Table 22

Historical Summary of Copper, Gold and Lead Production in New Brunswick

	COPPER		GOLD		LEAD	
	pounds	$	ounces	$	pounds	$
1955	71295	26290			1532706	220403
1956	12732	5272			949090	147204
1957	11476340	3322400	240	8052	2339993	326663
1958	655717	166683	52	1767	188179	21377
1959	0	0	0	0	0	0
1960	0	0	0	0	0	0
1961	0	0	0	0	0	0
1962	7347949	2277864	553	20688	3758717	372865
1963	17927959	5647307	1128	42582	3566150	392277
1964	18592024	6209736	1623	61268	43431670	5837216
1965	20162987	7581283	1659	62592	87307597	13532677
1966	14178625	6366203	1953	73648	103728630	15497058
1967	11572389	5504985	1421	53643	94032753	13164585
1968	16529547	7950712	2202	83037	108699770	14609250
1969	13581066	6984742	1396	52615	102184470	15501384
1970	16043948	9313833	5120	187187	125349740	19830329
1971	20532244	10841025	4236	149717	130810020	17659353
1972	20621087	10502113	3205	184633	90980354	14036449
1973	20620168	13154636	5202	506737	88023029	14206916
1974	25063149	19429203	4296	667255	105444320	21833300
1975	26277000	16739000	5000	757000	124527000	25341000
1976	22643073	15485371	3753	462021	143429338	32491047
1977	29160000	20257000	7000	1157000	134794000	41991000
1978	23613000	17570000	7000	1551000	156257000	57539000
1979	24060000	25691000	6000	2061000	166830000	99319000
	kg		gm		kg	
1980	9651000	25286000	275000	5803000	48673000	53170000
1981	12821000	28359000	152000	1174000	64920000	63732000

Table 23

Historical Summary of Silver and Zinc Production in New Brunswick

	SILVER		ZINC	
	ounces	$	pounds	$
1955	25087	22122		
1956	18182	16306	1061054	157460
1957	379173	331283	6627458	801260
1958	51139	44394	6323431	687989
1959	0	0	0	0
1960	0	0	0	0
1961	0	0	0	0
1962	178521	207977	4996488	604575
1963	332472	460141	21228005	2712939
1964	1469192	2056369	108743310	15408927
1965	2745274	3843384	247189480	37325612
1966	3108669	4349028	284790660	43003390
1967	3017416	5226165	302713880	43863241
1968	3654079	8451884	270858690	38191075
1969	4058976	7833824	305456430	46521013
1970	4377956	8469219	322187700	51324500
1971	5057627	7889898	323028130	54042606
1972	3906470	6523805	349071880	66571498
1973	3568678	9014480	385125471	92992396
1974	4464463	20666000	330271130	115264624
1975	4790000	21638000	406286000	152357000
1976	6183750	26577757	297034449	111756241
1977	5568000	27370000	356728000	124965000
1978	5749000	35429000	378323000	131494000
1979	6310000	74906000	583299000	225117000
	kg		kg	
1980	124000	97649000	144122000	138533000
1981	192000	77702000	232051000	278462

Table 24

Historical Summary of Cadmium, Bismuth and Antimony* Production in New Brunswick

	Cadmium		Bismuth		Antimony*	
		Revenue from Production		Revenue from Production		Revenue from Production
Year	lb	$	lb	$	lb	$
1964	22,859	74,063				
1965	44,634	124,082				
1966	37,584	96,967				
1967	54,035	151,244				
1968	68,179	194,310	33,103	142,674		
1969	113,400	394,632	76,300	376,922		
1970	158,901	565,688	39,717	249,025		
1971	135,000	262,000	37,000	203,000		
1972	31,490	79,670	38,592	50,056	5,799,900	
1973			57,000	283,000	4,637,160	
1974	71,630	284,873	153,530	1,258,639	5,404,545	4,249,344
1975	70,000	187,000	23,000	182,000	5,048,765	5,653,909
1976	5,587	14,666	240,164	1,776,253	6,342,591	5,372,195
1977	40,000	127,000	298,000	1,895,000	5,653,723	6,532,482
1978			300,000	1,156,000	5,609,669	4,775,099
1979			150,000	531,000	6,279,001	6,279,652
			kg			
1980			135,000	1,002,000	5,104,498	6,256,024
1981			76,000	527,000	3,628,755	4,404,166

* year ending June 30

Table 25

HISTORICAL SUMMARY OF GRAPHITE, GRINDSTONE AND MINERALS WATER PRODUCTION IN NEW BRUNSWICK

Year	Graphite		Grindstones*		Mineral Waters
	tons	$	tons	$	$
1886	500	4,000	2,255	22,495	--
1887	300	2,400	3,582	38,988	--
1888	150	1,200	3,793	30,729	--
1889	200	1,600	2,692	23,735	--
1890	150	1,200	4,034	33,804	--
1891	260	1,560	2,499	22,787	--
1892	--	--	2,821	23,577	--
1893	--	--	2,488	17,379	--
1894	--	--	1,629	16,717	--
1895	150	900	2,075	17,932	--
1896	45	315	2,263	18,810	--
1897	89	890	3,165	24,840	--
1898	260	2,600	3,513	32,425	--
1899	--	--	3,133	32,965	--
1900	120	1,440	4,128	40,850	--
1901	240	2,880	4,223	42,490	--
1902	200	2,400	3,559	36,000	--
1903	--	--	4,201	38,740	--
1904	60	480	3,620	35,450	--
1905	60	480	4,520	52,175	--
1906	--	--	4,340	50,134	--
1907	--	--	4,863	55,896	--
1908	40	360	3,370	43,325	14,894
1909	--	--	3,963	51,460	14,003
1910	--	--	3,586	43,700	16,000
1911	--	--	4,186	49,560	19,843
1912	--	--	4,038	48,330	--
1913	--	--	4,487	46,425	--
1914	--	--	3,626	49,234	--
1915	--	--	2,295	30,468	--
1916	--	--	3,205	46,982	--
1917	--	--	2,148	35,879	--
1918	--	--	2,816	75,005	--
1919	--	--	1,737	51,516	--
1920	--	--	2,233	79,696	--
1921	--	--	1,098	57,077	--
1922	--	--	903	40,050	--
1923	--	--	1,758	77,177	--
1924	--	--	2,113	99,299	--
1925	--	--	1,642	79,661	--
1926	--	--	1,684	90,975	--
1927	--	--	1,860	97,197	--
1928	--	--	1,609	80,451	--
1929	--	--	1,731	103,514	--
1930	--	--	495	35,689	--
1931	--	--	299	12,308	--
1932	--	--	256	11,802	--
1933	--	--	277	12,051	--
1934	--	--	535	27,091	--
1935	--	--	456	21,175	--
1936	--	--	412	17,982	--
1937	--	--	288	12,139	--
1938	--	--	175	9,192	--
1939	--	--	152	9,662	--
1940	--	--	255	12,000	--
1941	--	--	188	11,500	--
1942	--	--	216	10,000	--
1943	--	--	164	6,225	--
1944	--	--	225	12,000	--
1945	--	--	215	10,270	--
1946	--	--	295	17,450	--

---

*includes pulpstones, etc.

Source: StatsCan

Table 26

Historical Summary of Coal, Natural Gas and Petroleum in New Brunswick

Year	Coal		Natural Gas		Petroleum	
	tons	$	M cu.ft.	$	barrels	$
1886						
1887	10040	23607				
1888	5730	11050				
1889	5673	11733				
1890	7110	13850				
1891	5422	11030				
1892	6768	9375				
1893	6200	9837				
1894	6469	10264				
1895	9500	14250				
1896	7500	11250				
1897	6000	9000				
1898	6160	9240				
1899	10528	15792				
1900	10000	15000				
1901	17530	51857				
1902	18795	39580				
1903	16000	40000				
1904	9112	18224				
1905	29400	58800				
1906	34076	68152				
1907	34584	77814				
1908	60000	135000				
1909	49029	98496				
1910	55455	110910			1485	1326
1911	55781	111562			2461	3019
1912	44780	89560	173903	36549	2679	3799
1913	70311	166637	828603	174147	2111	3762
1914	98049	241075	425826	54249	1725	2742
1915	127391	309612	430692	60383	1020	1423
1916	147540	386016	610118	79628	1345	2653
1917	189095	708010	796775	103735	2341	5460
1918	208212	1331710	792396	107842	3009	7402
1919	166377	735386	682890	120510	4225	13141
1920	171610	1091440	682502	130506	5148	19963
1921	187192	920666	708743	139375	7479	33022
1922	287513	1107643	753898	148040	7778	32732
1923	276617	1196772	640300	126068	8826	35642
1924	217121	932185	599972	113577	5561	21313
1925	208012	815367	639235	122394	5376	18756
1926	173111	710245	648316	128300	10544	29940
1927	203950	885038	630755	124637	18244	41748
1928	207738	869104	660981	324344	8043	21391
1929	218706	909159	678456	333002	7499	19909
1930	209349	864118	661975	325751	6758	17318
1931	182181	743196	655891	323184	6577	15461
1932	212695	794168	662452	326191	6408	14372
1933	312303	1041744	618033	302706	8835	18111
1934	314750	1026343	623601	306005	11106	22277
1935	346024	1129019	615454	303886	12054	18230

(cont'd)

Table 26(cont'd)

Year	Coal		Natural Gas		Petroleum	
	tons	$	M cu.ft.	$	barrels	$
1936	368018	1190032	606246	298819	17112	24075
1937	364714	1180511	576671	283922	16089	25496
1938	342238	1133346	577492	284689	19276	27246
1939	400421	1566359	606382	292403	22799	32082
1940	547064	1367017	616041	300543	22167	31220
1941	523344	2021394	653542	317437	31359	44102
1942	471203	1624403	619380	299688	28069	39467
1943	372673	1641669	675029	327787	24530	34342
1944	345123	1845277	702464	341636	23296	32832
1945	361184	2021606	653230	317568	30140	42413
1946	370655	2099373	541010	262441	28584	40018
1947	345194	2301511	409810	279790.	23129	32381
1948	522136	3734635	420352	287446	21372	29920
1949	540866	3911371	375035	146864	19544	27362
1950	607116	4371076	301877	214665	17137	23992
1951	653439	4822369	261579	194313	15551	21771
1952	742823	5876736	202042	150073	14237	19932
1953	721252	5747073	177112	131368	14738	20633
1954	781471	6187622	183457	130405	13046	18265
1955	877833	7100649	186549	138450	12548	17567
1956	958266	7930446	190322	141315	16628	23279
1957	976797	8109859	176417	150641	19401	27161
1958	790719	6621369	123957	197199	15169	21265
1959	1005337	8347215	117502	198394	14479	20271
1960	1020064	8663379	98701	151603	14148	19807
1961	892473	7558899	86318	143215	12024	14429
1962	815534	6753042	95750	134476	10333	14466
1963	866027	7232170	103522	109520	7391	10347
1964	1002417	8456165	105055	112303	4686	6516
1965	995260	8637636	105359	105609	4103	5744
1966	896853	7893197	97 03	89913	6853	9591
1967	837029	7489617	103877	88002	8837	12372
1968	797359	7330396	112967	96878	7648	10707
1969	701952	5649611	106520	95016	9176	12846
1970	395642	2964478	131160	108011	9675	13544
1971	517209	3934987	105114	90547	9598	13437
1972	429544	3483530	97114	57133	8714	12200
1973	394219	3389776	81008	30752	9920	13888
1974	415000	5387000	88000	44000	8000	11000
1975	450000	7100000	90000	45000	8000	11000
1976	326658	5881707	100345	60875	5443	45721
1977	305924	6249803	85639	42820	5146	41168
1978	310000	6450000	92565	46282	5093	40744
1979	336000	10100000	97000	49000	5000	4000
	Tonnes		M^3		M^3	
1980	440000	17300000	2000	15000	1000	40000
1981	520000	2000000	2038	42000	331	38000

Table 27

Historical Summary of Iron and Manganese Production in New Brunswick

Year	Manganese Ore		Manganese Bog		Iron Ore	
	tons	$	tons	$	tons	$
1910					5,336	11,910
1911					31,120	69,464
1912					71,520	127,716
1913					86,416	153,820
1914					4,775	10,841
1915	150	3,600			3,683	8,261
1916						
1917						
1918						
1919						
1920						
1921						
1922						
1923						
1924	584	4,088				
1925						
1926						
1927						
1928			385	2,237		
1929			300	1,800		
1930	269	1,296	275	1,650		
1931	57	493	77	462		
1932						
1933						
1934						
1935	100	800				
1936	221	1,596				
1937	85	817				
1938						
1939	392	3,600				
1940						
1941						
1942	374	8,841				
1943	48	985				

Source: StatsCan

Table 28

List of Consultants, Linecutters, Geophysical Operators, Etc.

Name	
A.B.P. Consultants Ltd. H. E. Bent P. O. Box 321 Fredericton, N. B. E3B 4X9 (506) 455-0223	consulting engineering
ADI Limited 1115 Regent Street P. O. Box 44 Fredericton, N. B. E3B 4Y2 (506) 454-4491	consulting geotechnical engineering
John P. Anderle Ltd. P. O. Box 1554 Fredericton, N. B. E3B 5G2 (506) 454-4341	consulting exploration geologist
Atlantic Resource Planners P. O. Box 1301 Fredericton, N. B. E3B 5C8	
Donald Black 240 Lakeside Drive Bathurst, N. B. E2A 2S7 (506) 546-2666	linecutting, staking
Robert Connor Millville, N. B. ECH 1M0 (506) 463-2622	prospecting, linecutting, staking
Dallas W. Davis 500 Beaverbrook Court Fredericton, N. B. E3B 5X4 (506) 457-1601	Economic, Financial and Technical Consultant
N. L. Doucet Co. Ltd. 1428 St. Peter Avenue Box 523 Bathurst, N. B. E2A 3A8	surveying, linecutting, staking
Eastern Designers and Company Ltd. P. O. Box 613 Fredericton, N. B. E3B 5A6 (506) 454-3317	structural engineering
Ecological and Resource Consultants Ltd. P. O. Box 444 Fredericton, N. B. E3B 4Z9 (506) 455-5278	resource evaluation and environmental engineering

Econostrat 254 Willingdon Street Fredericton, N. B. E3B 3A5 (506) 455-5695	geological consulting
Geocon (1975) Ltd. 500 Beaverbrook Court Fredericton, N. B. E3B 5X4 (506) 455-8967	geotechnical consultants
Geosleuths Mineral Exploration Services P. O. Box 480 Sackville, N. B. E0A 3C0 (506) 536-0614 P. O. Box 1892 Sussex, N. B. E0E 1P0 (506) 433-5733	geology, geophysics, geochemistry
Wilfred P. Hachey 555 Thornton Avenue Bathurst, N. B. E2A 2W7	linecutting, staking, prospecting
IGM Services Ltd. P. O. Box 632 Fredericton, N. B. E3B 5A6 (506) 455-2241	integrated geoscience mapping
Calvin Johnson Rollingdam, N. B. E0G 2V0 (506) 466-1458	linecutting, claim staking, geophysical operator and geochemistry
Johnson Geophysics Ltd. P. O. Box 1506, Station A Fredericton, N. B. E3B 5G2 (506) 457-1072	linecutting, staking, geochemical and geophysical surveys, project consulting
Lockhart Exploration Services Ltd. P. O. Box 515 Fredericton, N. B. E3B 5A6 (506) 454-3508	linecutting, staking, consulting services, project management, etc.
Jeb Newhouse Amrex Ltd. P. O. Box 264 Shediac, N. B. E0A 3G0 (506) 532-5511	linecutting, staking, prospecting
Northeast Exploration Services Ltd. 185 Notre Dame Street Bathurst, N. B. E2A 3C8 (506) 546-9526	linecutting, staking, consulting services, etc.

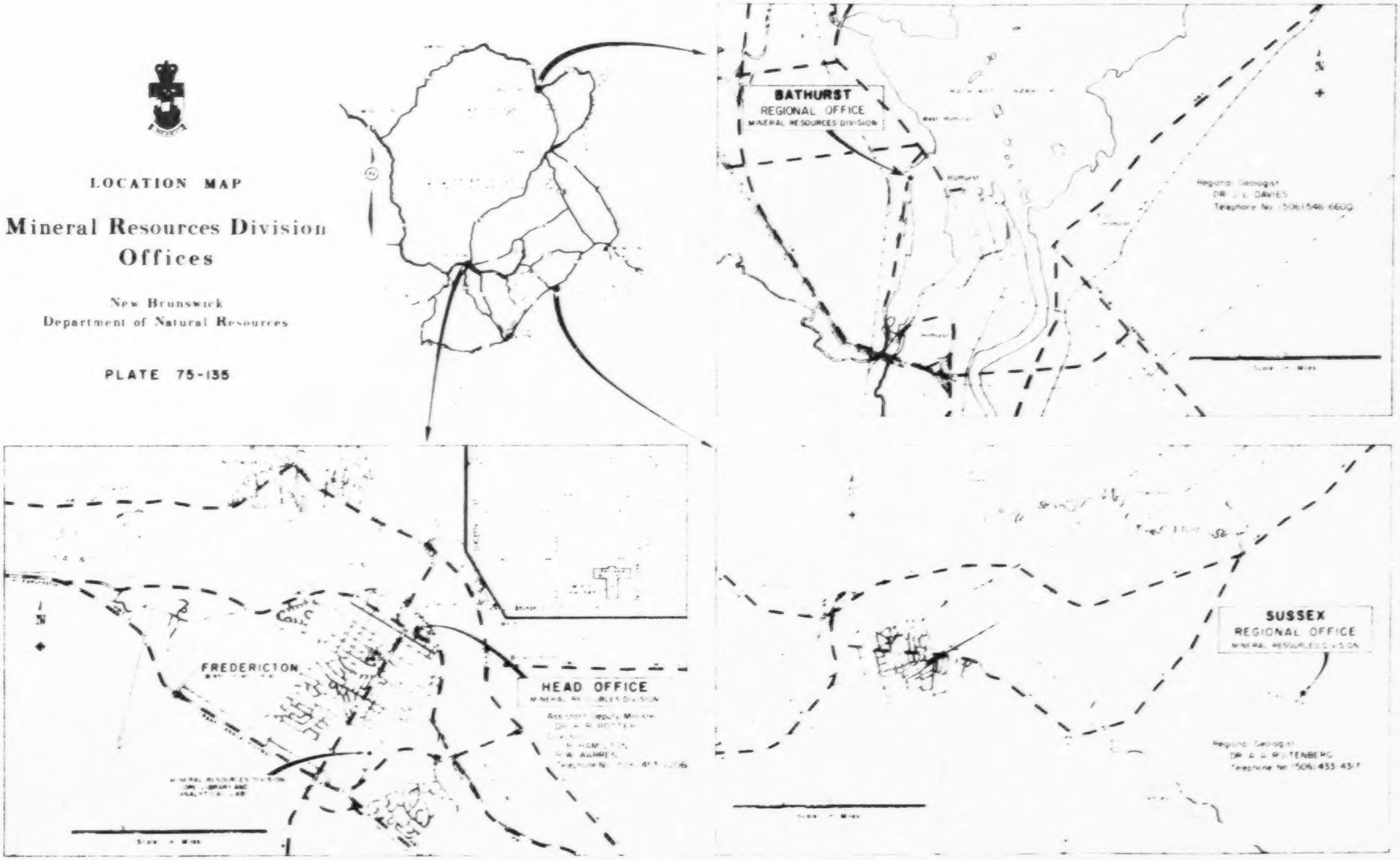
Phantom Exploration Services Ltd. Comp. 16, Site 7, R. R. #4 Fredericton, N. B. E3B 4X5	
Precise Surveys Ltd. R. R. #2 Redbank, N. B. E1V 3L9 (506) 836-7586	linecutting, claim staking, geochemical and geophysical surveying, prospecting, etc.
Mitch Scott P. O. Box 985 Sussex, N. B. E0E 1P0	linecutting, staking
Mike Smith R. R. #2, Box 755 Bathurst, N. B. E2A 3Y6 (506) 546-4327	linecutting, staking, geochemical and geophysical surveying, prospecting
Three-D Geoconsultants Limited P. O. Box 3133, Postal Station B Fredericton, N. B. E3A 5G9 (506) 454-8627	
Turnex Ltd. P. O. Box 270 Beresford, N. B. E0B 1H0 (506) 548-3252	linecutting, staking, geochemical and geophysical surveying
W. E. Hale and Associates P. O. Box 444 Fredericton, N. B. E3B 4Z9 (506) 455-5278	geological consulting services
K.D.A. Whaley Kingsclear, R. R. #6 Fredericton, N. B. E3B 4X7 (506) 363-3939	exploration geologist
W. H. Crandall & Associates 1077 St. George Boulevard Moncton, N. B. E1E 4C9	consulting engineers
Arnold White 671 White Lane Bathurst, N. B. (506) 546-3166	linecutting, staking

LOCATION MAP

Mineral Resources Division Offices

New Brunswick
Department of Natural Resources

PLATE 75-135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